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Chemicals and Allied Products

Agricultural Chemicals

ANHYDROUS AMMONIA EQUIPMENT, by Harold T. Barr. Louisiana. Agricultural Experiment Station. Feb 1952. 46p photos, diagr, graph, tables Available from Agricultural Experiment Station, Louisiana State University, Baton Rouge, La.
PB 107230

1. Ammonia, Anhydrous - Use as fertilizer 2. Fertilizers and manures.
Louisiana Bulletin no. 462.

Plastics and Plasticizers

FLAME AND HEAT RESINS FOR NAVAL CONSTRUCTION. REPORT NO. 2 ON CONTRACT N8-ONR-504, TASK ORDER NO. 1, by R. S. Holdsworth, H. W. Robinson, W. F. Brucksch, E. S. Ebers. United States Rubber Co. Naugatuck Chemical Division, Naugatuck, Conn. Apr 1948. 8p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107177

1. Resins - Heat resistance 2. Laminates, Heat resistant.

INJECTION MOLDING OF L-5 CERAMICS. REPORT NO. 2 UNDER CONTRACT NO. W-36-039-SC-32376, by Rawson E. Stark. Stupakoff Ceramic & Mfg. Co., Latrobe, Pa. Jan 1947. 104p drawing, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107166

Report dwells on the refinements of the extrusion and pressing arts in general, and the use of auxiliary agents in particular, rather than on a description of the processes as such. Report is divided into four major parts, namely Introduction, binders and plasticizers, miscellaneous low-loss body investigations and Special low-loss body investigations. Conclusions reached together with recommendations. For other reports on this contract see PB 104096-PB 104102, PB 107167-107168; for final report see PB 107015 and 107015s.

INJECTION MOLDING OF L-5 CERAMICS. REPORT NO. 7 UNDER CONTRACT NO. W-36-039-SC-32376, JAN 1-APR 1, 1948, by R. E. Stark. Stupakoff Ceramic & Mfg. Co., Latrobe, Pa. Apr 1948. 68p photos, drawings (part fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.00, Photostat $8.75.
PB 107167

Two dies were constructed and used. Various changes were made in nozzle, sprue, runner, and gate size and design. Other features which were added or improved were air vents, water heating channels, and a heater unit. Some experiments were conducted in processing of materials for injection. A special firing method was instituted. Various materials were injected using both dies, 2" disc & 7" rod and connector die. Best results were obtained with materials 7472, 7117, 7058 and 7116 on the connector die. See photograph in the appendix - Fig. 10. For other reports on this contract see PB 104096-PB 104102, PB 107166, PB 107168; for final report see PB 107015 and PB 107015s.

INJECTION MOLDING OF L-5 CERAMICS. REPORT NO. 8 UNDER CONTRACT NO. W-36-039-SC-32376, APR 1-JUN 30, 1948, by R. E. Stark. Stupakoff Ceramic & Mfg. Co., Latrobe, Pa. Jul 1948. 44p drawings (part fold), table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25.
PB 107168

Several new dies were constructed while another was revised to produce smaller samples. The latter die was also revised several times in an attempt to correct mechanical difficulties. Many materials were injected into the above dies under various conditions. It was found that small pieces can be molded more readily than large. Best results were realized with the connector die and #7472 material. Further improvements in specimen structure must be accomplished before the injection can be considered successful. Renewed efforts in material formulation must be instigated with emphasis on the synthetic resin type — particularly ethyl cellulose. For other reports on this contract see PB 104096-PB 104102, PB 107166-PB 107167; for final report see PB 107105 and PB 107015s.

INJECTION MOLDING OF L-5 CERAMICS. FINAL REPORT UNDER CONTRACT NO. W-36-039-SC-32376, by R. E. Stark. Stupakoff Ceramic & Mfg. Co., Latrobe, Pa. Apr 1949. 75p photos, drawing, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 107015

1. L-5 (Plastic) 2. Plastics - Molding, Injection 3. Dies, Injection molding - Design 4. Cellulose, Ethyl ether - Use in injection molding.
Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B. For earlier reports under this contract see PB 104096-104102, 107166-107168.

INJECTION MOLDING OF L-5 CERAMICS. FINAL REPORT, SUPPLEMENT, UNDER CONTRACT NO. W-36-039-SC-32376, by R. E. Stark. Stupakoff Ceramic & Mfg. Co., Latrobe, Pa. Jan 1950. 22p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107015s

Supplement to PB 107015, on results of four months supplemental work after end of contract period. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B.

RAIN EROSION PROPERTIES OF PLASTIC MATERIALS, SUPPLEMENT 1: DESIGN AND CONSTRUCTION OF LABORATORY TESTING DEVICE FOR ACCELERATED COMPARISON OF RAIN EROSION RESISTANCE OF PLASTIC MATERIALS, by Norman E. Wahl. U. S. Air Materiel Command.

Engineering Division. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1949. 42p photos, drawings, diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $6.25. PB 97575s

A magnetostriction oscillator was constructed similar in principle and design to apparatus used for testing the cavitation erosion resistance of metals for marine propeller use. It consists essentially of a 10 kilocycle magnetostriction oscillator with a power output of approximately 200 watts. The magnetostriction rod is made of laminated fully annealed nickel sheet 0.005 inch thick rather than a solid rod, to reduce eddy current losses. Each lamination is insulated from the adjacent lamination by a thin layer of nickel oxide. The laminations are bonded together with a phenolic electrical varnish and the rod is silver soldered at each end to prevent separation of the laminations. One-quarter wave of the half-wave 10 kilocycle magnetostriction rod is electromagnetically active while the other quarter wave section is excited by reflected energy. The plastic test specimen is attached by bonding with a thermoplastic adhesive to the end of the latter quarter wave rod section. The specimen end of the 3/4 inch square rod is immersed in water. The amplitude of motion of the specimen in the water is approximately 0.002 inch while the frequency is approximately 10,000 cycles per second. The test specimen is flat and 3/4 inch square. Some correlation of test results, as far as rating the materials in order of relative erosion resistance is concerned, of the magnetostriction oscillator tester with the rotating arm type testers and service data has been obtained on a few plastic materials. However, the apparatus has not been completely evaluated as yet as a rapid laboratory tester for determining the relative rain erosion resistance of plastic materials. Several factors, such as the strength of the bond between the specimen and the rod end, affect the rate of erosion of the specimen. Due to these factors and other objectionable features which are discussed in Appendix 1, the magnetostriction oscillator is not recommended at present as a testing device for determining the relative erosion resistance of plastic materials. Cover date is Feb 1950.

SYNTHESIS OF SOME TERPENE CARBOXYLIC ESTERS AND THEIR PRELIMINARY EVALUATION IN SELECTED HIGH POLYMERS, by Torsten Hasselstrom, Clifford E. Balmer, Norene E. Kennedy and Harold W. Coles. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. General Laboratories. Sep 1949. 73p photos, diagrs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 107202

The present report describes syntheses, as well as the plasticizing action of the final products on cellulose esters, polystyrene and polyvinyl-butyral resins. The procedures cover the synthesis of alkyl-substituted cylopentane- acids, keto-cyclobutane-acids and bicyclic ring-substituted acetoacetic acids and esters of such acids, from commercially available raw materials and industrial waste products by conventional and new methods; and preliminary testing of final products for their low temperature characteristics, plasticizing properties in plasticizer-polymer complexes and for their fungistatic action. QMC RR CS 2.

Paints, Varnishes and Lacquers

AIRCRAFT MATERIAL SPECIFICATION: CLEANING MATERIAL FOR DOPE AND PAINTWORK. Gt. Brit. Ministry of Supply. Dec 1951. 3p photos Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 107120

1. Paints, Aircraft - Cleaners - Specifications - Gt. Brit. 2. Dopes, Aircraft - Cleaners - Specifications - Gt. Brit. 3. Cleaning materials - Aircraft - Specifications - Gt. Brit. 4. MS DTD MS 445. 70-9999.

PAINTING WOODWORK. Gt. Brit. Ministry of Works. 1952. 8p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.10. PB 107083

1. Woodwork - Painting - Gt. Brit. 2. MOW AL 25. 67-9999.

PREPARATION OF SILICONE COMPOUNDS FOR USE IN HIGH-TEMPERATURE ORGANIC FINISHES, II, by Harold J. E. Segrave. U. S. Naval Research Laboratory. Jun 1952. 24p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.75. PB 111018

The investigation of silicone polymer systems for use in high-temperature resistant coatings has been extended. The effect of meta- and para-fluorophenyl and of meta-trifluoromethylphenyl groups on silicone resins containing them has been determined. These single substituents failed to improve the heat resistance of the resins. Silicones prepared directly from Grignard reaction mixtures were shown to be inferior to those prepared from pure chlorosilanes at the same charge ratios. A silicon resin prepared by a process developed under contract to the U. S. Army Signal Corps was equivalent in heat resistance to commercially available silicone protective coating resins. The results have been discussed in the light of currently accepted theories of silicone resin preparation and performance, and recommendations made accordingly. For part I see PB 105748. NRL R 3994.

Miscellaneous Chemicals

ACROLEIN AND XANTHATE MANUFACTURE, TECHNICAL RUBBER AND WHITE CARBON TESTS. Deutsche Gold- und Silberscheideanstalt A. G., Frankfurt am Main, Ger. 1944-1945. 15p drawings, tables (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $3.75. PB 91068

1. Acrolein - Production - Germany 2. Xanthates - Production - Germany 3. Micro BIOS FD 2060/46, Frames 1-14 4. Micro BIOS DOC 1081/B117X, Frames 1-14.

See also BIOS FR 423, Item 22 (PB 34028).

ACTION OF PHENYLMAGNESIUM BROMIDE ON 6-CHLOROCAPRONITRILE, by Julius Weinstein. Jun 1950. 61p tables Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $3.00, Photostat $8.75. PB 107099

The reaction between 1.5-dichloropentane and potassium cyanide is investigated for the purpose of increasing the yield of 6-chlorocapronitrile. An analysis of the data is made on the basis of effect of a solvating agent, reaction time, and ratio of 1,5-dichloropentane to potassium cyanide. A report is given of the attempt to prepare α-phenyldehydrohexamethyleneimine by the procedure of Coke for the preparation of α-substituted pyrrolines and tetrahydropyridines. Furthermore, the preparation of cyclopentyl cyanide by the action of sodium amide on 6-chlorocapronitrile is given. The formation of α-phenyldehydrohexamethyleneimine, involves the decomposition by water of the addition compound from the reaction of cyclopentyl cyanide and phenylmagnesium bromide. Data from the infrared analysis of cyclopentyl cyanide and cyclopentyl phenyl ketone are presented. Thesis-Rensselaer Polytechnic Institute.

CATALYTIC TESTS CONCERNING 250 AND 600 ATM. AROMATIZATION IN 1-LITER FURNACES WITH ALUMINA, BLEACHING EARTH AND SYNTHETIC SILICATE CATALYSTS, by Reitz. I. G. Farbenindustrie A. G. Sep 1941. 14p tables (part fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 17664t3

1. Catalysts, Aromatization - Germany 2. Catalysts, Silica alumina - Germany 3. Catalysts, Alumina - Germany 4. Micro TOM 165, Frames 381-397, translation.

Translated by M. Beth, Sinclair Refining Co. Annexed graphs may be photostatted upon request.

PINIC ACID DIESTERS; THEIR PREPARATION, PROPERTIES, AND LUBRICANT APPLICATIONS, by C. M. Murphy, J. G. O'Rear, and W. A. Zisman. U. S. Naval Research Laboratory. Jun 1952. 22p tables (1 fold) Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.75. PB 111019

The preparation and properties are reported for a new class of diesters prepared from pinic acid and normal alcohols containing from 4 to 10 carbon atoms. These compounds compare favorably with the diesters of aliphatic dibasic acids and 2-ethylhexanol as regards V. I., pour point (or freezing point), volatility, and lubricity. Lubricating oil compositions have been developed which establish the suitability of the dialkyl pinates for a wide variety of applications. Excellent pinate-base greases have also been prepared with soap and other gelling agents. Mixtures of pinates with other types of esters, petroleum oils, polyethers, compatible silicones, and other synthetic oils can be used to formulate improved lubricant compositions. The commercial development of pinic acid at low unit cost from α-pinene is eminently desirable as it is potentially available in large supply from turpentine-a native raw material. In addition to its use in synthetic lubricants, this dibasic acid has excellent possibilities for the synthesis of low-temperature plasticizers, polymers, resins, and fibers. NRL R 3995.

PREPARATION OF 1-METHYL-4-CYCLOPROPYL-PIPERIDINE-4-CARBOXYLIC ACID AND RELATED COMPOUNDS, by William A. West. Jun 1950. 147f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.75, Enlargement Print $20.00. PB 107096

1. Isonipecotic acid, 4-Cyclopropyl-1-methyl 2. Isonipecotic acid, 4-Cyclopropyl-1-methyl - Ethyl ester 3. Rensselaer Polytechnic Institute, Troy, N. Y.

Thesis-Rensselaer Polytechnic Institute.

STUDY OF THE MANNICH REACTION AND THE PREPARATIONS OF AMINO DERIVATIVES OF METHYL CYCLOPROPYL KETONE, by Pascal H. Y. Tao. Aug 1949. 25p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107097

A study was made of the Mannich reaction, and the preparation of amino derivatives of methyl cyclopropyl ketone was investigated. The Mannich reactions has been a very practical method of introducing the alkyl amino group into various compounds containing an active hydrogen atom. Attempts to prepare cyclopropyl B-amino ethyl ketones were not very satisfactory. The use of piperidine hydrochloride gave the best yield among all the secondary amines that have been used. Thesis-Rensselaer Polytechnic Institute.

Electrical Machinery

Communication Equipment

DESIGN OF A SUPPRESSED LOCALIZER-ODR ANTENNA FOR THE A. V. ROE JETLINER, by W. A. Cumming. National Research Council of Canada. Radio and Electrical Engineering Division. May 1952. 10p photo, drawings, diagr, graphs Available from National Research Council of Canada, Ottawa, Canada. $.25. PB 107058

Design and test data are given for a suppressed Localizer-Omnidirectional Range (ODR) antenna installed in a plastic fin cap on the A. V. Roe Jetliner. The antenna has satisfactory electrical characteristics for Localizer-ODR service over the frequency range 108-118 megacycles per second, and occupies a space 22 inches long, 9 inches wide, and 8 inches high, above the top rib of the fin. NRCC 2687. NRCC ERA-223.

LOW-NOISE WIDE-BAND 200-MC INSERTION AMPLIFIER, by R. Lowell. U. S. Naval Research Laboratory. May 1952. 10p photos, diagrs Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.25. PB 111012

A noise figure of 2.5 db at 225-Mc was obtained using the Western Electric 416A microwave triode as a grounded-grid amplifier. The low noise figure is due to the low transit-time grid loading (about 250 mhos) as well as to the low equivalent plate-noise resistance (50 to 80 ohms) of the 416A. Two circuits,

designed with lumped parameters, had gains of approximately 10 db and bandwidths of approximately 70-Mc. NRL R 3979.

RADIO TEST SET AN/UMR-41 (VERY LOW FREQUENCY INTERFERENCE AND FIELD INTENSITY MEASURING EQUIPMENT). INTERIM DEVELOPMENT REPORT ON CONTRACT NO. NOBSR-52455 INDEX NO. NE120813, JUNE 15, 1951, COVERING THE PERIOD OCTOBER 1, 1951 TO MARCH 31, 1952. Televiso Corporation, Chicago, Illinois. 1952. 74p photos, fold drawings, diagrs (part fold), graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 107195

The purpose of work is to develop and fabricate equipment suitable for very low frequency (30 to 15,000 C.P.S.) radio interference and field intensity measurements. In final form it is expected the equipment will have additional fields of application where a sensitive selective voltmeter or wave analyzer may be required. Contents: Appendix I. Appendix II: Stability of the feedback selective amplifier. Technicians included E. E. Birr, J. M. Banic, E. Bajars, K. C. Kim, C. Gerlach, W. Benson, F. Hamilton and C. Dubsky.

Electronics

ANALYSIS OF PARA-ELLIPTIC REFLECTOR, by Benjamin Goldberg. U. S. Engineer Board. Electrical Engineering Branch, Fort Belvoir, Va. Apr 1944. 33p diagrs, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107200

1. Reflectors, Parabolic 2. Reflectors, Searchlight 3. Reflection - Theory 4. Mirrors, Searchlight 5. Mathematical equations and solutions 6. ENG EB Proj. EL 413.

Includes letter of Apr 19, 1943 requesting this research and development and solution of equations used in this project.

BRIDGE FOR MEASURING THE INTERFACE IMPEDANCE OF OXIDE-COATED CATHODES, by L. R. McNarry. National Research Council of Canada. Radio and Electrical Engineering Division. Jun 1952. 9p photo, diagrs Available from National Research Council of Canada, Ottawa, Canada. $.25. PB 107138

Rapid measurement of the interface impedance of oxide-coated cathodes is made possible by the instrument described in this paper. The bridge is balanced at three widely different frequencies, and the interface resistance and capacitance are read directly from decade units in the bridge circuit. All tubes to be tested are connected as diodes; thus the results are independent of tube characteristics. Low values of interface resistance may be read to within one ohm. NRCC 2745. NRCC ERA 213.

DOUBLE PARABOLIC CYLINDER PENCIL BEAM ANTENNA, by Roy C. Spencer. U. S. Air Force. Electronics Division. Antenna Laboratory, Cambridge Research Center, Cambridge, Mass. Apr 1952. 11p photo, diagr, graphs, table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107067

Radiation from a point source placed on the focal line of a parabolic cylinder is reflected in succession from this cylinder and from a second parabolic cylinder crossed so that its focal line coincides with the directrix of the first cylinder. Each cylinder collimates the beam in one plane, the double reflection being equivalent to single reflection from a paraboloid of revolution. The device is applicable to both microwaves and light. AAF CRL E 5084.

DUAL-CHANNEL ROTATING COUPLER FOR NAVIGATIONAL AND DOCKING RADAR, by F. V. Cairns. National Research Council of Canada. Radio and Electrical Engineering Division. May 1952. 13p drawings (1 col.) graphs Available from National Research Council of Canada, Ottawa, Canada. $.25. PB 107137

A dual-channel rotating coupler for the NRC Navigational and Docking Radar is described. The characteristics of this coupler are: (a) A voltage standing-wave ratio of less than 1.14/1 in the transmitting channel, and a voltage standing-wave ratio of less than 1.20/1 in the receiving channel, over the NAD radar frequency band of 9375 ± 30 megacycles per second. (b) 0.3 decibel attenuation in each channel (c) 76 decibels decoupling between channels (d) An estimated power-handling capacity of 50 kilowatts. Color in fig. 1 will not reproduce. NRCC 2614. NRCC ERA 218.

GEIGER COUNTER TECHNIQUE FOR X-RAY DIFFRACTION. PART 2: METHOD OF DETERMINING THICKNESSES OF THIN COATINGS, by Herbert Friedman and LaVerne S. Birks. U. S. Naval Research Laboratory. Anacostia Station, Washington, D. C. Feb 1944. 10p diagr, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107204

1. Coatings - Thickness - Measurement 2. Coatings - X-ray inspection 3. Geiger counters 4. X-rays - Diffraction 5. NRL H2246.

For Part 1 see PB 107203.

LEAD NETWORKS UTILIZING A SATURABLE CORE MEMORY, by D. G. Scorgie. U. S. Naval Research Laboratory. Jul 1952. 12p diagrs, graphs Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111022

The "square" hysteresis loop associated with many of the new grain-oriented iron alloys has been useful in magnetic amplifiers because it can be applied so that a small amount of signal power at one point in time can successfully control large amounts of power at a later time. The same nonlinearity is applicable to a lead network filter with the result that stabilizing effects can be obtained in a closed loop control system with very little sacrifice of power. This is in contrast with linear phase lead networks where in the steady state most of the power is lost. The input to the new circuits is a modulated ac carrier and the output is a sequence of pulses which may be either

ac or dc. Output and input pulses are related, up to the carrier frequency, in the same fashion as those of an ideal lead network of the "proportional-plus-derivative" type. Input noise of frequency above the carrier frequency is not differentiated and hence does not contribute to the high noise typically present in the output of standard lead networks. The pulsed form of output is satisfactory in lead networks, since they are followed by time-lag elements which cannot distinguish between pulsed and smooth inputs of the same area. NRL R 4006.

MEASUREMENTS OF AFTERGLOW BRIGHTNESS AND DECAY CHARACTERISTICS OF SOME SPECIAL HIGH VOLTAGE CATHODE RAY TUBES WITH BIRMINGHAM 2168 SCREENS, by P. L. Waters. Gt. Brit. Ministry of Supply. Telecommunications Research Establishment, Gt. Malvern, Worcs, England. May 1948. 10p graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107197

1. Vacuum tubes, Cathode ray - Tests - Gt. Brit. 2. Vacuum tubes, Cathode ray - Screens - Gt. Brit. 3. Afterglow - Measurement - Gt. Brit.

T.R.E. report no. T2106.

MICROWAVE BEAM-SHAPING ANTENNAS, by L. J. Chu. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1947. 12p photo, diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107183

A simple procedure for designing microwave beam-shaping antennas is described. The power from a line or point source is reflected by a reflector of a special design so that it is distributed in a prescribed fashion in space. Simple laws of geometric optics are used. Some typical experimental results are given. This work was started in the Radiation Laboratory, Massachusetts Institute of Technology, in 1943. SIG Contract W36-039-sc-32037. MIT RLE TR 40.

MICROWAVE SCHMIDT SYSTEM, by H. N. Chait. U. S. Naval Research Laboratory. May 1952. 20p photos, diagrs, graphs Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111014

A microwave analogue of the Schmidt optical system has been developed for use as a wide-angle scanning antenna. A technique for the off-axis correction of the Schmidt increased its field of view and permitted a total scan of 20 beamwidths with little deterioration of the beam characteristics. The side-lobe level remains at least 20 decibels below the peak intensity and the beamwidth and gain are fairly constant over the entire scan. NRL R 3989.

PREPARATION, PROPERTIES AND CATHODE RAY TUBE SCREEN CHARACTERISTICS OF BIRMINGHAM 2168 PHOSPHOR, by G.F.J. Garlick. Gt. Brit. Ministry of Supply. Telecommunications Research Establishment, Gt. Malvern, Worcs, England. Jan 1946. 17p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107196

1. Vacuum tubes, Cathode ray - Screens - Gt. Brit. 2. Phosphors - Preparation - Gt. Brit. 3. Phosphors - Physical properties - Gt. Brit. 4. Phosphors - Light emission - Gt. Brit. 5. Phosphors, Magnesium fluoride - Gt. Brit. 6. Afterglow - Measurement - Gt. Brit.

T.R.E. report no. T1995.

PROGRESS REPORT FOR JANUARY - MARCH 1952. National Research Council of Canada. Radio and Electrical Engineering Division. Apr 1952. 35p photos, drawings, diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. Limited supply available free from National Research Council of Canada, Ottawa, Canada. PB 107111

1. Radiophysics - Canada 2. Engineering, Electrical - Canada 3. Radar - Canada 4. Electronics - Canada 5. Navigational aids - Canada 6. NRCC ERA-225.

RADAR REFLECTOR DESIGN, by Virginia T. Norwood. U. S. Camp Evans Signal Laboratory, Belmar, N. J. Feb 1950. 37p photos, drawings, diagrs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107184

1. Radar - Reflectors - Design 2. Reflection - Theory 3. Reflecting materials 4. SCEL TM M1319.

Dept. of the Army project: 3-20-05-021. Signal Corps project: 472D-1.

Food and Kindred Products

FOOD CANNING. REPORT OF A VISIT TO THE U.S.A. IN 1951 OF A PRODUCTIVITY TEAM REPRESENTING THE BRITISH FOOD CANNING INDUSTRY. Anglo-American Council on Productivity. May 1952. 133p photos, map, drawings (part fold) Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.70. PB 106456

1. Canning industry 2. Machinery, Canning.

Fuels and Lubricants

CATALYTIC CRACKING. PREPARATION OF A SYNTHETIC ALUMINA SILICATE CATALYST, by (Dr.) Michael. Jun 1950. 2p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 81691t

1. Catalysts, Alumina - Germany 2. Fuels, Liquid - Cracking, Catalytic - Germany 3. Micro TOM 141, Frames 44-46 translation.

Translated by M. Beth, Sinclair Refining Co.

CORROSION PREVENTIVE ADDITIVES. REPORT NO. 7, FINAL REPORT, JAN 20, 1950-MAR 1, 1951, UNDER CONTRACT NO. AF33(038)-9202, PROJECT NO. 90-806B, by Morris Feinleib and Howard T. Francis. Armour Research Foundation, Chicago, Ill.

Mar 1951. 28p diagr, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107169

A dependable test for ball bearing corrosion in instrument oils was developed and data on the basic corrosion mechanism were obtained. Work was also begun on the fractionation of petroleum sulfonates, and present indications are that the corrosive effect can be attributed to a particular fraction of these sulfonates. Appendix: Chromatographic separation of sulfonates, by Edward Rapkin and E. J. Schwoegler.

EFFECT OF SURFACE ACTIVE AGENTS ON PETROLEUM FUELS, by F. G. Kitson. Canada. National Aeronautical Establishment. 1952. 8p graph, table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. Limited supply available from National Aeronautical Establishment, Montreal Road, Ottawa, Canada. PB 107179

The possibility of lowering the surface tensions to improve atomization of petroleum fuels by means of surface active agents has been studied. Static surface tension measurements of solutions of polyoxyethylene detergents and lead naphthenate in aviation kerosine were made. No appreciable effect was found. This is shown to be in agreement with theoretical considerations. It is concluded that no significant lowering of the surface tensions of petroleum fuels can be expected by the usual surface active materials. Note 8. Information contained in this report was published in July 1951 as Laboratory report LR-5. NAEC N8. NAEC LR-5.

FLUIDIZED DRYING AND BRIQUETTING LOW-RANK WESTERN COALS, by Neal Rice and T. L. Johnston. Wyoming. University. Natural Resources Research Institute, Laramie, Wyoming. Dec 1951. 29p photos, drawing, tables Available from University of Wyoming. Natural Resources Research Institue, Laramie, Wyo. PB 106666

1. Coal - Briquetting 2. Coal - Drying 3. Dryers, Coal - Design 4. Wyo NRRI B5.

Bulletin no. 5.

GASOLINE DEHYDROGENATION UNDER HYDROGEN PRESSURE WITH MOVING CATALYST. REPORT NO. 3: COMPARISON OF IRAQ-, MID-CONTINENT- AND EAST TEXAS HEAVY NAPHTHAS, by Oettinger, Nonnenmacher Donath. Mar 1950. 7p table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107236t2

1. Naphtha - Dehydrogenation - Germany 2. Micro TOM 126, Frames 701-715, translation.

Translated by M. Beth, Sinclair Refining Co.

Graphs may be photostated upon request.

METHOD FOR SEPARATION OF ALIPHATIC OXYGEN-CONTAINING COMPOUNDS AND OF STRAIGHT CHAIN HYDROCARBONS OF AT LEAST 6 CARBON ATOMS FROM MIXTURE CONTAINING THEM. DISCOVERER: DR. FRIEDRICH HAGEN. B190, 197 IVd/12 SUBMITTED MAR 18, 1940. O.Z. 12,438, by Dr. Bergen. Mar 1940. 4p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107240t

1. Oxygen compounds, Aliphatic - Separation - Patents - Germany 2. Hydrocarbons - Separation - Patents - Germany 3. Patents - Germany B190,197 IVd/12 Mar 18, 1940 4. Patents - Germany O. Z. 12,438.

Translated by M. Beth, Sinclair Refining Co.

ORGANO-PHOSPHORUS COMPOUNDS. TECHNICAL REPORT NO. VI, PERIOD SEP 1, 1950 TO NOV 30, 1950, UNDER CONTRACT NOS. N9 ONR-87500 AND-87501, PROJECT NO. NR 055205. Shell Development Co., Emeryville, Calif. Jan 1951. 45p photos, diagr, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107159

Technical Report No. VI, discusses the preparation and evaluation of phosphonates as potential lubricants and/or hydraulic fluids, to the exclusion of phosphinates and phosphine oxides, as the latter two classes of compounds have not appeared promising. The total numbers of preparations of this period are as follows: phosphine oxides, 9 (total for six quarters, 10); phosphinates, 0 (19) phosphonates, 18 (53); phosphates, 0 (2) miscellaneous, 1 (11); grand total, 19 (95). The number of phosphonates (18) can be broken down in this manner: 2 monophosphonates for use as intermediates; 3 monophosphonates for evaluation; 6 polyphosphonates for evaluation, of which 4 were bis-compounds; and 7 repeated syntheses of promising compounds as "bottoms-products", that is, the materials were not distilled. The latter were evaluated to ascertain whether or not they still retained their favorable characteristics on elimination of the tedious molecular distillation to which they had previously been subjected. Report no. S-13255.

R433-AROMATIZATION-CHROMIUM OXIDE CATALYSTS WITH ADDITION OF ACTIVATOR, by (Herr) Roelen. Aug 1950. 2p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107235t

1. Catalysts, Aromatization - Germany 2. Micro TOM 46, Frames 1027-1028, translation.

Translated by M. Beth, Sinclair Refining Co.

REPORT OF MINE EXPLOSION DISASTER, DEC 21, 1951, NEW ORIENT MINE, WEST FRANKFORT, ILL, by Archer S. Gordon and Frank Raymon. U. S. Chemical Corps. Medical Laboratories. May 1952. 13p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107145

1. Coal mines and mining - Accidents 2. CC MD SR 12.

SYNTHETIC LIQUID FUELS. ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1951. PART I: OIL FROM COAL. U. S. Bureau of Mines. Jul 1952. 170p photos, drawings, diagrs (part fold), graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $6.25, Photostat $21.25. Limited supply available free from U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes St.,

Pittsburgh 13, Pennsylvania. PB 107232
1. Fuels, Synthetic - Production 2. Coal - Hydrogenation 3. Gasoline - Synthesis 4. Fischer - Tropsch process 5. BM RI 4865.
For Part II see PB 107233.

SYNTHETIC LIQUID FUELS. ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1951. PART II: OIL FROM OIL SHALE. U. S. Bureau of Mines. Jul 1952. 166p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $6.25, Photostat $21.25. Limited supply available free from U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes, St., Pittsburgh, 13, Pennsylvania. PB 107233
1. Fuels, Synthetic - Production 2. Oil shales - Hydrogenation 3. Oil shales - Plants 4. Shale oil - Production 5. BM RI 4866.
For Part I see PB 107232.

Highways and Bridges

ANALYSIS OF LANDSLIDES. PRESENTED AT THE THIRTY-FIRST ANNUAL MEETING, JANUARY 1952. Highway Research Board. 1952. 45p photos, diagrs, graphs, tables Available from Highway Research Board, National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. $.60. PB 107113
1. Landslides - Analysis 2. Highways - Safety 3. Highways - Retaining devices 4. Roads - Structural stability 5. Roads - Surface treatment - Soil compaction 6. HRB BUL 49.
National Research Council. Publication 220. Contents: Determining corrective action for highway landslide problems, by R. F. Baker. - Appendix A: Typical stability analysis. Appendix B: Elimination methods. - Appendix C: Description of control methods - retaining devices. - Appendix D: Control methods - direct rebalance of ratio between resistance and force. - Use of field, laboratory and theoretical procedures for analyzing landslides, by H. Gordon Larew.

THE LOUISIANA STRUCTURAL ENGINEERING CONFERENCE, NOVEMBER 14, 1951, SPONSORED BY THE CIVIL ENGINEERING DEPARTMENT OF THE COLLEGE OF ENGINEERING, LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, BATON ROUGE, LA. Louisiana. Engineering Experiment Station, Baton Rouge, La. 1952. 48p diagrs Available from Louisiana State University. Engineering Experiment Station, Baton Rouge, La. $.50. PB 107077
1. Bridges - Construction 2. Bridges - Design 3. Bridges - Foundations and piers 4. Bridges - Substructure - Construction 5. Bridges - Load distribution 6. Bridges, Steel 7. Bridges, Concrete - Prestressed 8. Steel - Welding 9. Personnel management 10. L EES B 30.
Contents: Foreword, by H. A. Mike Flanakin. Design of superstructure, by R. N. Bergendoff - Soil mechanics as related to substructure design, by Ralph B. Peck. - Problems of the substructure contractor, by O. W. Anschuetz. - Welding, by H. C. Boardman. - Prestressed concrete, basic principles and structural characteristics, by D. L. Chaney. - Excerpts from "Have you tried listing?" by Wesley Wiksell.

TRAFFIC RESEARCH PROBLEM STATEMENTS, PRESENTED AT THE 31ST ANNUAL MEETING, JAN 14-18, 1952. Highway Research Board. 1952. 38p Available from Highway Research Board, National Research Counci, 2101 Constitution Ave., N. W., Washington, D. C. $.45. PB 107249
1. Traffic - Research 2. HRB SR 3.

Instruments

GEIGER COUNTER TECHNIQUE FOR X-RAY DIFFRACTION. PART 1: SPECTROMETER FOR MEASURING POWDER DIFFRACTION PATTERNS, by Herbert Friedman and LaVerne S. Birks. U. S. Naval Research Laboratory. Anacostia Station, Washington, D. C. Feb 1944. 30p photos, drawings, fold diagr, graphs, (part fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107203
A Geiger counter X-ray spectrometer for powder diffraction is described in this report. The counters are almost 100 percent efficient when used with target radiations from molybdenum to chromium. The spectrometer employs a focusing geometry which yields intense diffraction patterns. For the purpose of chemical identification, the counter spectrometer is many times as fast as cameras of equivalent resolution. It simplifies the technique and extends the range of X-ray diffraction in quantitative chemical analysis. Spacings are measurable from 1.0 Å to 150 Å with copper ratiation. For Part 2 see PB 107204. NRL H 2235.

RADIO INTERFERENCE MEASUREMENTS AND MODIFICATIONS ON AUDIOMETER EQUIPMENTS (STOCK NO. 3-074-100), REPORT SUBMITTED BY ERWIN LEVEY. WORK PERFORMED UNDER CONTRACT NOBSR-52386 BETWEEN BUREAU OF SHIPS, NAVY DEPARTMENT AND ELECTRO-SEARCH. Electro-Search, Philadelphia, Pa. Apr 1952. 77p photos, diagrs, graphs (part fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 107102
This report gives a detailed analysis of interference tests performed on a Maico Model H-1 Audiometer. In this work the unit was considered as both a source and a receiver of interference. For the equipment considered a source of interference, each cause of interference was analyzed separately and the methods employed either to reduce or completely eliminate it are discussed in detail. Where applicable, recommendations are made in specific instances in addition to those used on the actual prototypes built and tested. For the equipment considered a receiver of interference, a similar type of analysis is made in terms of the specific problems encountered in this phase of the work. A report on the work done on two other model audiometers is also included in the Appendix. These are Audio Development Company

Models 50E and 50E2. Contents: Appendix: Section I. Introduction - Second II, Audio Development Company Model 50E Audiometer. - Section III. Microtone Company Audiometer, ADC Model 50E2.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 1 ON CONTRACT NOBSR-52386 FROM INCEPTION DATE TO 30 JUN 1951, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Jun 1951. 4p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107208

1. Instruments, Measuring - Radio interference 2. Electromedical apparatus.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 2 ON CONTRACT NOBSR-52386, JUL 1 TO JUL 31, 1951, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Aug 1951. 5p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107209

1. Instruments, Measuring - Radio interference 2. Electromedical apparatus.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 3 ON CONTRACT NOBSR-52386, AUG 1 TO AUG 31, 1951, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Sep 1951. 4p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107210

1. Instruments, Measuring - Radio interference 2. Electromedical apparatus.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 4 ON CONTRACT NOBSR-52386, SEP 1-SEP 30, 1951, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Nov 1951. 4p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107211

1. Instruments, Measuring - Radio interference 2. Electromedical apparatus.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENT. INTERIM REPORT NO. 6 ON CONTRACT NOBSR-52386, NOV 1 TO NOV 30, 1951, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Dec 1951. 5p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107213

1. H-1 (Audiometer) 2. Audiometers - Tests 3. Instruments, Measuring - Radio interference.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENT. INTERIM REPORT NO. 7 ON CONTRACT NOBSR-52386, DEC 1 TO DEC 31, 1951, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Jan 1952. 6p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107214

1. Audiometers - Tests 2. Instruments, Measuring - Radio interference.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 8 ON CONTRACT NOBSR-52386, JAN 1 TO JAN 31, 1952, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Feb 1952. 7p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107215

1. Audiometers - Tests 2. Instruments, Measuring - Radio interference.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 9 ON CONTRACT NOBSR-52386, FEB 1 TO FEB 29, 1952, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Mar 1952. 7p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107216

1. H-1 (Audiometer) 2. SW660 (Diathermy unit) 3. Audiometers - Tests 4. Diathermy apparatus - Tests 5. Instruments, Measuring - Radio interference.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENT. INTERIM REPORT NO. 10 ON CONTRACT NOBSR-52386, MAR 1 TO MAR 31, 1952, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Apr 1952. 9p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107217

1. Diathermy, Apparatus - Tests 2. Radio interference - Measurements 3. Instruments, Measuring -

Radio interference 4. Electromedical apparatus. For other reports on this contract see PB 107102, PB 107114, PB 107208-107216.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 12 ON CONTRACT NOBSR-52386, MAY 1 TO MAY 31, 1952, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Jul 1952. 7p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107231

1. Diathermy apparatus - Tests 2. MF-49 (Diathermy unit) 3. SW 600 (Diathermy unit) 4. Instruments, Measuring - Radio interference 5. Filters, Electric.
For other reports on this contract see PB 107102, PB 107114, PB 107208-107217.

THÉORIE NON-LINÉAIRE DE L' ANÈMOMÈTRE À FIL CHAUD (NONLINEAR THEORY OF A HOT-WIRE ANEMOMETER), by R. Betchov. Jul 1952. 23p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107106

A theoretical analysis is presented for the hot-wire anemometer to determine the differences in resistance characteristics as given by King's equation for an infinite wire length and those given by the additional considerations of (a) a finite length of wire with heat loss through its ends and (b) heat loss due to a nonlinear function of the temperature difference between the wire and the air. Technische Hoogenschool te Delft, Laboratorium voor Aero- on Hydrodynamica. Mededeeling 61. Translated from Koninklijke Nederlandsche Akademie van Wetenschappen te Amsterdam, Verhandelingen, v. 52, no. 3, 1949, p. 195-207. See also PB 107105. NACA TM 1346.

Lumber and Wood Products

NEW METHODS IMPROVE TURPENTINE: BETTER PROCESSING AND DISTILLATION PRACTICES YIELD LOW-ACID PRODUCT, by E. P. Waite and N. C. McConnell. U. S. Naval Stores Station, Olustee, Fla. Jun 1950. 11p photos, drawing Available from the U. S. Dept. of Agriculture, Washington 25, D. C. PB 107165

1. Turpentine - Distillation 2. AIC 556. U. S. Department of Agriculture PA-107.

SELECTED GOVERNMENT RESEARCH REPORTS, VOL. 8: WOOD. Gt. Brit. Ministry of Supply. 1952. 235p photos, fold diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $4.75. PB 107117

1. Aircraft - Wood construction - Gt. Brit. 2. Wood - Research - Gt. Brit. 3. Wood - Electrical properties - Gt. Brit. 4. Wood - Heating, Dielectric - Gt. Brit. 5. Timber - Strength - Gt. Brit. 6. Plywood - Strength - Gt. Brit. 7. Plywood - Bending - Gt. Brit.

S. O. Code no. 47-166-8. Contents: no. 1. "Strawberry mark" in Sitka spruce timber, by B. J. Rendle. May 1945. - no. 2. Investigation of failures in wood by microscopical examination, by A. F. Rayne. Oct 1945. - no. 3. Timber for aeroplane construction: Strength properties of American Whitewood, by J. Latham, E. H. Nevard and C. B. Pettifer. Jul 1944. - no. 4. Timber for aeroplane construction: Strength properties of Kara redwood, by J. Latham, E. H. Nevard and C. B. Pettifer. Jul 1944. - no. 5. Timber for aeroplane construction: Strength properties of Sitka spruce, by J. Latham. Aug 1943. - no. 6. Substitute timbers for Sitka spruce for aeroplane construction: Strength properties of western hemlock (revised) by J. Latham, E. H. Nevard and C. B. Pettifer. Sep 1943. - no. 7. Timber for aeroplane construction: Strength properties of Douglas fir, by J. Latham, E. H. Nevard and C. B. Pettifer. Mar 1944. - no. 8. Chemical factors involved in the utilization of wood in association with metals, by W. G. Campbell and D. F. Packman (In Rapperts presentes au Congrès International pour l'Exploitation et l' Utilisation rationelles du Bois, tome 2, p. 15, 141-143) 1947. - no. 9. High-frequency electrical properties of wood and wood-resin combination, by R.F.S. Hearmon. Mar 1944. - no. 10. Dielectric heating, a survey of developments and applications, with special reference to the heating of wood and glues, by P.M.C. Lacey. Nov 1944. - no. 11. Summary of movements with moisture change of improved woods, by H. A. Howe. Jul 1945. - no. 12. Limiting radii of curvature of various species of 3-plywood at approximately 11% moisture content, by N. Turner. Dec 1945. - no. 13. Influence on bending properties of wood laminae and plywood of soaking in a solution containing tanning agents, by N. Turner. Aug 1940. - no. 14. Bending of Sitka spruce scarf joints for use in laminated bends, by N. Turner. Dec 1941. - no. 15. Influence of production methods on the final shape and strength of laminated bends, by W. C. Stevens, N. Turner and J. Latham. Oct 1943. - no. 16. Limiting radii of curvature of Sitka spruce, western hemlock and Douglas fir sliced laminae (with an appendix on the effect of "loose" face on such radii) by N. Turner. Dec 1943. - no. 17. Hair checks and imperfections in Sitka spruce laminae, by N. Turner and J. Latham. Aug 1943. - no. 18. Investigations into the causes leading to the twisting of laminated bends, by W. C. Stevens and N. Turner. Nov 1945. - no. 19. Effect of method of conversion, i.e. sawn or sliced, on the limiting radii of curvature of Sitka spruce laminae, by N. Turner and Constance Webster. Jan 1947. - no. 20. Effect on the appearance and adhesion strength of laminated bends of home-grown oak sawn approximately to the required dimensions before drying, by N. Turner and Elizabeth Bearn. Apr 1947. - no. 21. Tests designed to investigate the influence of curtain factors likely to affect the limiting radius of curvature in the bending of Canadian birch (Betula lutea) three-ply, by N. Turner and Constance Webster. Nov 1947.

Machinery

BELT AND CHAIN DRIVES, CARE AND MAINTENANCE OF. U. S. Bureau of Ships. Jul 1949. 12p photos, drawings, diagrs Available from Office of

Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111005

1. Drives, Belt - Maintenance and repair 2. Drives, Chain - Maintenance and repair 3. NAVSHIPS IN 94.

HIGH-TEMPERATURE LUBRICATION OF ELECTRIC MOTOR BALL BEARINGS, by J. E. Brophy, J. Larson, C. R. Singleterry, and W. A. Zisman. U. S. Naval Research Laboratory. May 1952. 89p photos, drawings, diagr, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $2.25. PB 111015

The 5-year program just completed was aimed at the development of greases and ball bearings suitable for lubricating electric motors at bearing temperatures from -40° to 150°C. Research activities of this Laboratory were coupled with those of a number of leading industrial manufacturers of electric motors, ball bearings, and lubricants by means of an industrial cooperative committee of the Bureau of Ships. As a result of this development program, recommendations were made to the Bureau of Ships upon which was based the recent specification MIL-G-15719 (Ships). New or improved methods for laboratory testing of greases and for bench testing of motor ball bearings were evolved for use at 150°C. Nine newly developed greases (all of which are now commercially available) were investigated and tested jointly. These included a mineral oil gelled with a strontium soap, two mineral oils gelled with sodium soaps, a mineral oil-diester blend gelled with lithium soap, a polyalkylene glycol derivative gelled with lithium soap, and four silicone greases one of which was gelled with carbon black and the others with lithium soaps. Only the silicone-lithium soap greases were useful at 150°C for over 100 hours of operation without regreasing. Lowering the temperature to 125°C resulted in a large increase in the life of all greases tested; the silicone-soap grease having a clear advantage over all the others. However, several nonsilicone greases gave dependable operation at 125°C for 1000 to 2000 hours without regreasing. For operation at 100°C the three soap-gelled silicone greases and three of the nonsilicone greases gave 10,000 to 15,000 hours of satisfactory operation without relubrication. For maximum utilization of the class H insulation in motors, the lubrication system should be so designed that the grease reservoir will tend to inject fluid into the bearing or that the fluid bled from the greases will migrate into the bearing. Rotating shields on the bearing, a larger reservoir of grease within the bearing, sealed bearings, use of nonferrous materials for separators, and use of bearings stabilized at higher temperatures should all be considered in future designs. Until such design changes in bearings and end bells have been effected to make the best use of greases at high temperatures, the relubrication interval should be between 500 and 1000 hours for continuous operation at 150°C, or much less frequent if operation is below that temperature for over 50 percent of the time. NRL R 3971.

HYDRAULIC FEEDING DEVICE AND PRESSURE CONTROL FOR TOOL MACHINES, by Alfred Dürr. n.d. 23p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107201t

1. Tools, Machine - Controls - Germany 2. Hydraulic equipment - Germany.

Appendix B, translation.

REPORT ON ENGINE TESTS WITH CHEMICAL SOURCES OF OXYGEN (NL-B6B) TO JULY 21, 1941, by W. J. Sweeney. U. S. National Defense Research Committee. Aug 1941. 60p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107198

1. Engines - Air fuel ratio 2. Engines, Diesel - Fuels 3. Fuels, Diesel - Tests 4. OSRD 60.

For May 1941 report see PB 9401; for Dec 1941 report see PB 8310. Fourth progress report on special engine project no. 41.

Medical Research and Practice

COBALT-60 TELETHERAPY UNIT: OUTPUT, DEPTH DOSE AND ISODOSE DISTRIBUTIONS, by W. R. Dixon, C. Garrett and A. Morrison. National Research Council of Canada. Division of Physics. Feb 1952. 49p photos, diagrs, graphs, tables Available from the National Research Council of Canada, Ottawa, Canada. $.75. PB 107172

1. Tumors - Therapy - Canada 2. Tumors - Radiotherapy - Canada 3. Cobalt - Radioactivity - Canada 4. Cobalt - Isotopes - Therapeutic use - Canada 5. Teletherapy - Canada 6. NRCC 2667 7. NRCC PR-129.

COCHLEAR MICROPHONICS FOLLOWING NOISE EXPOSURE, by Juergen Tonndorf and F. A. Brogan. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1952. 13p drawing, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107224

Cochlear microphonics were measured in guinea pigs before, during, and after exposure to white noise of 130 db intensity and 30 minutes duration or to an equal amount of a line-spectrum noise (300-cycle square wave). The results were differentiated as to changes in both the AC and the DC potentials. Both forms of change appeared to be more severe and recovered to a lesser degree in the animals of the white noise group than in those of the line-spectrum group. These results are explained by the fact that overload, normally apparent in gradient curves of cochlear microphonics in response to short presentation of intense pure tones, increases with the spectral density of the test signal. AAF SAM Project no. 21-27-001, Report no. 7.

CORRELATION OF STATIC AND PHYSICAL ENDURANCE. I: A TEST OF PHYSICAL PERFORMANCE BASED ON THE CARDIOVASCULAR AND RESPIRATORY RESPONSE TO GRADUALLY INCREASED WORK, by Bruno Balke. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1952. 17p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107116

Physical exercise on the treadmill was used to determine the reactions of pulse rate, pulse pressure, pulmonary ventilation, and gas exchange to gradually increased work. The speed of the treadmill was kept constant and the angle was raised from minute to minute. The initial work load and the additional steps were kept small enough to allow for functional adaptations. The test was carried on until a pulse frequency of 180 was reached. In general that was the point of an individual's "optimal work capacity." When work was continued beyond that point a decrease in pulse pressure indicated cardiovascular inadequacy, the oxygen uptake dropped, the respiratory exchange ratio exceeded 1.0, and the ventilation equivalent for oxygen increased out of proportion. Test criteria were duration of the test in minutes and/or the performed work in meterkilograms at the cut-off point. AAF SAM Proj. 21-32-004, Report no. 1.

EFFECTS OF HYPERSENSITIVITY AND STRESS ON SERUM LIPOPROTEIN, by Robert F. Redmond, Lawrence J. Milch, and William W. Calhoun. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1952. 8p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107186

Lipid, lipoprotein, and protein patterns were studied in the blood of 115 rabbits after, (1) exposure to altitude, (2) ACTH administration, (3) having been rendered hypersensitive to horse serum, and (4) all combinations of these treatments. The hypersensitive rabbits demonstrated markedly increased serum cholesterol and alpha-2 globulin concentrations and correspondingly decreased levels of the serum alpha-1 globulins and the A/G ratio. There was little indication that either altitude exposure or ACTH administration modifies the effects of hypersensitivity on the blood serum patterns. The combined interaction of all three treatments was found to elevate the serum concentration of S_f 12-20 class of lipoproteins. This latter observation is receiving further study in connection with the generalized problem of atherosclerosis. AAF SAM Proj. no. 21-32-020, Report no. 2.

EFFECTS OF IONIZING RADIATION UPON PHYSICAL AND PSYCHOLOGICAL CAPACITIES IN VARIOUS SPECIES. I: EFFICIENCY OF THE SERIAL MULTIPLE VISUAL DISCRIMINATION APPARATUS AND METHOD WITH WHITE RATS, by Paul E. Fields. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1952. 16p photos, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107154

A 5-stage, 5-choice serial multiple visual discrimination apparatus (SMVDA) and method are described in which it is possible to secure data on 5 different problems from individual rats at better than the 1 percent level of confidence in five test trials. With one problem, the probability of getting all correct responses in the same 5 trials is 3×10^{-17}. Various combinations of brightness, acuity (size), matching (tuitional control), simple multiple choice (position), and absolute versus relative discrimination problems have been tested simultaneously. Precise measurement of minimal differences between groups due to various hazards has been greatly simplified. AAF SAM Project no. 21-47-003, Report no. 1.

INFLUENCE OF POLYCYTHEMIA PRODUCED AT HIGH ALTITUDE ON RESISTANCE TO INFECTION. VI: RESPONSE TO INFLUENZA A VIRUS INFECTION, by L. Joe Berry, Roland B. Mitchell and David Rubinstein. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1952. 9p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107153

Mice exposed to simulated altitudes of 15,000 to 20,000 feet were permitted to recover for either one day or three weeks at normal pressures. These mice were infected with dilutions of influenza A virus along with normal control mice and mice made anemic by standardized hemorrhage. The LD_{50} dosage was calculated for each group. Control mice had the highest titer, 6.38, and mice given three weeks of recovery from altitude had the lowest titer, 5.56. Thus the recovered mice required about seven times the amount of virus for 50 percent mortality as the control mice. This difference may be statistically significant but additional experimentation is necessary for confirmation. Contract no. AF 33 (038)-17842. AAF SAM Project no. 21-35-005, Report no. 6.

MONOCHLOROMONOBROMOMETHANE: INHALATION TOXICITY, PATHOLOGY, AND SYMPTOMATOLOGY IN RATS AND MICE, by Charles C. Comstock, J. K. MacNamee, Ernest E. Ozburn, Ralph W. Fogleman, Fred W. Oberst. U. S. Chemical Corps. Medical Laboratories, Army Chemical Center, Md. May 1952. 22p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107146

1. Methane, Bromochloro - Pathology 2. Methane, Bromochloro - Physiological effects 3. Methane, Bromochloro - Toxicity 4. CC MD RR 113. Project no. 4-61-14-002.

MUSCULAR STUDIES IN RATS ACCLIMATIZED TO COLD. I: METHOD OF MEASURING MUSCULAR FATIGUE IN RATS, by Bernhard Hoelscher. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1952. 8p photo, diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107152

The work output of the electrically stimulated masseter muscle of the intact rat is measured during exposure to hypoxia in a small altitude chamber by using a mechano-electrical transducer as pick-up device and a Grass ink-writer as recorder. Stimuli, EKG, and respiration are recorded as well. The method described has proved to be valuable for studying the effect of acclimatization to cold on muscular work potential. In addition to this, information is obtained on the role of cardiac function in muscular fatigability. AAF SAM Project no. 21-33-002, Report no. 1.

RETINAL ADAPTATION IN NIGHT FLYING, by Paul A. Cibis. U. S. Air Force. School of Aviation Medi-

cine, Randolph Field, Texas. May 1952. 10p photo, drawing, diagr, graphs, table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107070

Temporary loss of ability to see the horizon on dark nights has been reported by experienced pilots who regained sight of the horizon when flying in inverted position. An experimental study under simulated night flying conditions revealed strong evidence that the observed phenomena are physiological effects of local retinal adaptation. These effects are enhanced during oxygen deficiency. AAF SAM Project no. 21-31-014.

SURGICAL APPROACH TO THE BULLA TYMPANICA IN THE GUINEA PIG, RABBIT, CAT, AND DOG (TOPOGRAPHIC-ANATOMICAL STUDY), by Juergen Tonndorf. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1952. 16p photos, drawings Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107222

The skeletal anatomy is described briefly, and the approach to the bulla tympanica is outlined in detail, the differences among the four species being pointed out. The accessibility of the organs of the middle and inner ear is discussed in order that one might choose the animal best suited for various experimental purposes. AAF SAM Project no. 21-27-001, Report no. 4.

TIME THRESHOLD PERIMETRY. I: A REVOLVING PERIMETER FOR STUDYING THE REGIONAL SENSITIVITY AND TIME FACTORS IN VISUAL SENSATION, by Paul A. Cibis, Francis A. Brogan, and Horst G. Fleck. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1952. 13p photos, diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107115

An instrumental setup is described for use in studying time factors in vision. It consists of: (a) a rotatable perimeter; (b) a click generator with variable intensity output; (c) a displacement meter for measuring the apparent displacement of visual objects due to differences in the latent period of perception; and (d) an amplifier set and dynograph. Formulas are derived for the total light energy effective at the retina over a given time and for pattern combinations. A general outline of the applicability of the apparatus, and definitions of various time factors are given. AAF SAM Project no. 21-31-006, Report no. 1.

TWO FORMS OF CHANGE IN COCHLEAR MICROPHONICS: PARALLEL SHIFT IN STIMULUS INTENSITY AND TRUNCATION OF GRADIENT CURVES, by Juergen Tonndorf and F. A. Brogan. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1952. 16p diagr, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107223

Changes of gradient curves in cochlear microphonics resulting from injury of the ear are differentiated into two forms which are to a certain degree independent of each other; these are parallel shift in stimulus intensity and truncation. Parallel shift represents a loss of the AC potential and is probably caused by alterations in the mechanical structure. Truncation results from a drop of the DC-resting potential of the cochlea which in turn may stem from ionization processes within the organ. Both forms of change occurring after traumatization of the ear may, therefore, be considered as an indication of structural and cytochemical alterations which may or may not be reversible. AAF SAM Project no. 21-27-001, Report no. 6.

Metals and Metal Products

AIRCRAFT MATERIAL SPECIFICATION: CLEANING MATERIAL FOR METAL. Gt. Brit. Ministry of Supply. Dec 1951. 2p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 107121

1. Cleaning materials - Metals - Specifications - Gt. Brit. 2. MS DTD MS 756.
70-9999.

AUTORADIOGRAFISK UNDERSÖKNING AV BLYFÖRDELNING I 18-8-STAHL (AUTORADIOGRAPHIC INVESTIGATION OF LEAD DISTRIBUTION IN 18-8 STEEL), by L. G. Erwall, A. Franzén and M. Hillert. 1951. 10p photos, table (Text in Swedish) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107188

The distribution of lead in stainless steel with 0.004% lead was studied by means of autoradiography using the lead isotope ThB(Pb^{212}) as indicator of the position of lead. The autoradiographs were taken on a stripping emulsion (Kodak Autoradiographic Plate) and were studied and compared with the etched steel surface at various magnifications up to 400 X. Summary in English. Reprinted from Jernkonterets annaler, vol. 135, 1951, p. 219-228.

DATA BOOK OF STEELS. U. S. Munitions Board. Office of Materials. Jul 1951. 34p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107178

The tabulations presented are intended as a reference to illustrate the various classes of steel, their composition, physical characteristics and applications.

EFFECT OF TEMPERATURES FROM -70° TO 600°F ON STRENGTH OF ADHESIVE-BONDED LAP SHEAR SPECIMENS OF CLAD 24S-T3 ALUMINUM ALLOY AND OF COTTON- AND GLASS-FABRIC PLASTIC LAMINATES, by H. W. Eickner, W. Z. Olson and R. F. Blomquist. U. S. National Advisory Committee for Aeronautics. Jun 1952. 26p drawings, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107023

The performance of 14 commercial adhesives at temperatures from -70° to 600°F was evaluated in lap shear specimens of clad 24S-T3 aluminum alloy

TECHNICAL REPORTS

PUBLISHED MONTHLY

News letter

U. S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES
WASHINGTON 25, D. C.

NO. 39, SEPTEMBER 1952

PLASTIC PATCHING FOR STEEL PIPING

An emergency technique for repairing holes in steel pipe lines carrying gases or liquids was evolved by the Navy's Damage Control Training Center. A glass cloth patch is placed over the hole and is secured in place by a wrapping of glass cloth tape.

An active resin applied to the glass cloth and tape generates its own heat to "cure" itself and thus "sets" the entire patch into a rigid mass which withstands pipe line pressures up to 300 pounds per sq. in. Described in June 1952 issue, Bureau of Ships Journal, available from Government Printing Office, Washington 25, D. C., at 20 cents per copy.

TOWARD BETTER DIESEL FUELS

A key to the development of better fuel for diesel engines is the temperature at which the fuel spontaneously bursts into flame when oxygen is added to it, and the time delay required for this ignition to occur. Scientists at the Naval Research Laboratory developed and improved form of an earlier testing technique for obtaining this data about different diesel fuels. This improved technique aids our progress toward better diesel fuels because: 1) It requires very small quantities of the test fuel; 2) it provides data on the test fuel under different environmental conditions; and 3) it sheds light on the process of diesel fuel combustion. Order PB 106126, Mimeograph $1.00.

PRODUCTIVITY POINTERS for FOOD INDUSTRIES

For a management engineer's-eye-view of the U. S. food industry that is rich in productivity pointers see these book-length reports by British Productivity Teams which recently studied the respective branches of our food industry.

FOOD CANNING. Emphasizes particularly the help provided to our food canning industry by the food machinery and can manufactures. Other key factors responsible for the high productivity in this U. S. industry are highlighted in the detailed chapters on American Canneries, Canning of Strained and Junior Foods, Canning of Fish, and Science and the Industry. Order PB 106456, 133 pages. $1.70.

PACKET FOODS. The British Team studying manufacture of packaged foods (cereals, cake-mixes, soups, etc.) in the U. S. found that the higher producti-

THE NEWSLETTER is a monthly digest of outstanding technical reports available to business firms and laboratories from Federal and other nonconfidential research sources. Special emphasis is placed upon items of interest to smaller business firms. The Newsletter may be purchased as part of the Bibliography of Technical Reports (subscription price, $5 per year) or separately (50c per year).

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vity level in U. S. was due to: More productivity measurement, greater mechanization, better machinery, better plant, and more attractive packaging. Especially good are chapter-length reviews of: Management control and office management; supplies, production methods and factory buildings; scientific control and research; and sales and distribution. A chapter on "Individual Products" reviews the latest U. S. techniques for producing cake mixes, breakfast cereals, self-raising flour, spices, and powdered deserts. Order PB 106436, 90 pages. $1.15.

CAKES AND BISCUITS. While picking up ideas that could help productivity in the British baking and confectionery industries the team presents many which we could borrow from them. Particularly good reviews of prevailing American practice are given in the chapters on "Biscuit Production," and "Cake Production and Processing." Plant layout, packaging, scientific testing and research, personnel management and labor relations are also discussed. Order PB 106455, 92 pages. $1.15.

TIME "MICROSCOPE"

A valuable tool for development of better electronic equipment (such as radar) is a new cathode-ray tube which gives a "visual" picture of phenomena occuring in intervals as small as one thousandth of a millionth of a second. A Naval Research Laboratory report describes how this tube was developed jointly by the Laboratory and a tube manufacturer, and gives detailed characteristics of the new tube. Order PB 106746. Mimeograph $.50.

BETTER HIGH SPEED ELECTRONIC COUNTERS

To reduce present elaborate electronic high-speed counters to a 1-tube, low power-consumption affair, scientists working for the Signal Corps explored the fundamental physics involved in "shifting" glow discharges from one electrode to another at high speed. Their report presents fundamental data on the process and describes design of small, light-weight cold cathode tubes capable of counting rates up to 100,000 per second. Tube life of 20,000 hours is indicated, and power consumption is considered reduced to 1/16 that of present (high vacuum tube) electronic counters of comparable speed.

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Order PB 106 178, "The Basic Study of Special Cold Cathode Discharge Tubes for High Speed Counting Applications", Microfilm $4.50, Photostat $13.75. An "Addendum" to this report gives added data and construction drawings of the tubes developed. Order PB 106 178S, Microfilm $1.75, Photostat $2.50.

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German World War II technical developments, patents and patent applications are excellent sources for finding early roots of many present-day technical developments vital in patent searches for prior art. To dig up the early roots of developments in your industry the easy, time saving way, use the appropriate technical report on German industry in World War II in the collection at the O. T. S. For example:

SYNTHETIC FUELS - BY HYDROGENATION. Hydrogenation of coal, tar and heavy oils to produce low boiling point hydrocarbons was intensively developed by the I. G. Farbenindustrie in Germany before and during World War II. A report by the U. S. Office of Military Government for Germany entitled I. G. Rights in the Hydrogenation Field first reviews the history of technical developments in hydrogenation made by this company and patent battles it carried on in this field. The report then lists German, British, French and U. S. Patents on hydrogenation under the following headings: Catalysts, Methods of Operating, Raw Materials and Finished Products, and Combination Processes. Order PB 93328, 158 pages. Microfilm $6. Photostat $20.

CARBON BLACK, HYDROGEN PEROXIDE, and HYDROGEN CYANIDE. Just made publicly available is a 960-frame microfilm reel collection of material found by Allied Intelligence teams in German chemical plants and laboratories at the end of World War II. Reel contains numerous papers on carbon black manufacture and application; on processes for manufacture and application of hydrogen cyanide and its compounds; and on manufacture and application of hydrogen peroxide.

(Cont'd on next page.)

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FOR THE SHOPMAN

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METALLIZING. The wire and powder techniques for producing a sprayed-on metal surface (metallizing) are described in this pamphlet. It also discusses the use of metallizing for corrosion protection, reclaiming worn parts, increasing wear resistance of bearing surfaces, and for coating scare onto non-scare materials.

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to itself and that of 7 commercial adhesives at -70° to 250°F in lap joints of cotton-fabric-phenolic laminate to itself, of glass-fabric-polyester laminate to itself, and in joints of each of these laminates to clad aluminum. One hot-setting tape adhesive was found to be consistently superior to all others in lap-joint specimens of aluminum tested at 450°F after 192 hours at 450°F. The best of the commercial adhesives evaluated at -70° to 250°F in lap shear specimens of plastic laminates bonded to themselves and to aluminum had only fair resistance to stressing immediately upon reaching 250°F. The adhesives generally performed adequately in the various joints at -70°F. NACA TN 2717.

INSTRUMENTATION AND FUNDAMENTAL EXPERIMENTS IN PLASTICITY, by D. C. Drucker and F. D. Stockton. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jun 1952. 58p photos, drawings, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107228

A number of basic experiments on the behavior of thin walled aluminum alloy tubes in the plastic range are described, and the techniques of measurement are given in some detail. Of especial interest are: the construction and performance of a mechanical extensometer for measuring axial and circumferential strain, the behavior of resistance wire strain gages in the plastic range, a successful simple means of making a lever-type testing machine indicate load accurately without moving the poise, and the significance of the test results in terms of the mathematical theory of plasticity and experimental stress analysis. In particular, repeated tests have verified that at a given state of stress the ratios of the plastic strain increments are independent of the ratios of the stress increments. Contract N7onr-35801, T. O. I, NR-041-032. Preliminary report on this work was presented at the Third Symposium on Plasticity Sep 1950. GDAM A11-68/58. GDAM TR 68.

INVESTIGATION OF ELECTROFORMING METHODS OF MANUFACTURE OF WAVE GUIDES. SUMMARY REPORT TO BUREAU OF AERONAUTICS, NAVY DEPARTMENT, by W. H. Safranek, W. C. Schickner and C. L. Faust, July 19, 1948 to May 10, 1950. Battelle Memorial Institute, Columbus, Ohio. May 1950. 110p photos, drawings, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107078

A process was developed and is described for electroforming aluminum. It was used successfully for electroforming straight segments with the RG-66/U wave-guide cross-section and complex-shaped segments with right-angle bends, U-bends, twists, and/or tapers. The inner surfaces of the experimental aluminum wave guides were shiny and smooth, a desired characteristic for satisfactory radar-wave transmission. The improved procedure for making mandrels, which resulted in the smoother inner surfaces, is applicable for electroforming wave guides in nickel or iron, as well as in aluminum. The physical properties of the aluminum electroforms compared favorably with the properties of electroforms made in a heavy metal, such as copper, nickel, or iron. Aluminum electroforms as thick as 0.040 inch were dense, strong, and ductile. Outer surfaces were as smooth as, or smoother than, the surfaces of commercial copper, iron, or nickel plates of equal thickness. On parts with a complex shape, the aluminum plate was more uniform in thickness than copper, nickel, or iron plates would be. Most of the electroformed aluminum segments were stronger and harder than commercial aluminum wave guides made by extrusion, being as hard as 45 to 70 Knoop, compared with 40 Knoop for a commercial wave guide. Contract NOa(s) 9409, May 10, 1948. Contents: Appendix I. Confirmatory tests on methods reported in the literature for electrodepositing light metals and their alloys. - Appendix II: Methods for preparing and maintaining the aluminum electroforming baths. - Appendix III: Plating equipment for aluminum chloride-ethyl pyridinium bromide-toluene baths. - Appendix IV: Anodes and operating conditions for electroforming aluminum wave-guide segments. - Appendix V: Procedure for making mandrels. - Appendix VI: Physical properties, microstructure, and purity of electroformed aluminum. - Appendix VII: Results of reinforcing electroformed segments with sprayed aluminum and plastic and procedure for spraying and flanging. - Appendix VIII: Results of modifications in formulating and/or operating aluminum plating baths. - Appendix IX: This section of the report is a copy of the letter transmitting the electroformed aluminum wave-guide segments to the sponsoring agency, the Bureau of Aeronautics. (This appendix IX is missing).

IRON AND STEEL. REPORT OF A PRODUCTIVITY TEAM REPRESENTING THE BRITISH IRON AND STEEL INDUSTRY WHICH VISITED THE UNITED STATES OF AMERICA IN 1951. Anglo-American Council on Productivity. Jun 1952. 164p photos, fold maps, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.25. PB 106458

1. Iron - Manufacture 2. Steel - Manufacture 3. Steel - Production costs 4. Steel - Production statistics.

IRON AND STEEL PRODUCTION PROBLEMS. Kaiser Wilhelm Institut für Eisenforschung, Düsseldorf, Ger. 1938-1944. 703f photos, drawings, graphs, tables (Test in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $9.00, Enlargement Print $90.00. PB 82022

1. Iron - Manufacture - Germany 2. Steel - Manufacture - Germany 3. Micro BIOS FD X440 4. Micro FIAT X-88, Frames 6215-6913.

MANUFACTURE OF TITANIUM ALLOYS, BY E. I. LARSEN, L. S. BUSCH, R. H. DICKINSON, AND G. W. BAUER. TITANIUM PROJECT, NAVY CONTRACT NO. NOA(S) 51-006-C, REPORT NO. 9, FINAL REPORT FOR PERIOD AUG 3, 1950 TO DEC 31, 1951. Mallory, P. R. & Co., Inc., Indianapolis, Ind. Dec 1951. 101p photos, graphs, tables (part fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107150

The melting, casting of ingots, forming, metallo-

graphy and properties of experimental melts of titanium and its alloys are compared. Titanium alloys with silicon or vanadium alone and with 2 or 3 of each of the elements: silicon, manganese, aluminum, vanadium, chromium and iron were prepared. The alloys melted in graphite crucibles from commercial lots of titanium sponge contained approximately 0.44% carbon, 0.021% nitrogen, and 0.182% oxygen. Most alloys were forged at 900-950°C. An as forged 3%Al-5%Cr alloy gave 183,500 psi ultimate tensile strength with 7.8% elongation. Small silicon additions were found to be beneficial in increasing strength and resistance to air and nitrogen at elevated temperatures. Material in cold rolled sheet from containing vanadium was strong, ductile, and more bendable than other alloys tested. A forged alloy of 2% aluminum-2% iron had these good medium strength properties; 147,000 psi utlimate strength with 12.6% elongation when tested at room temperatures. This alloy had the highest hardness at 600°C of those tested. All alloys were sensitive to notch effects in izod impact tests. Aluminum-iron and vanadium-iron alloys of titanium are hardenable by quenching from forging temperatures. Memo. no. 8000-M-484. For earlier Titanium project reports see PB 100000, PB 102870, PB 103370, PB 104518.

MECHANICAL PROPERTIES OF EXTRUDED MAGNESIUM ALLOYS ZK 60 AND AZ 80, by W. J. Trapp. U. S. Air Materiel Command. Engineering Division. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1950. 28p photos, diagrs, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107265

In investigating the mechanical and fatigue properties of two extruded magnesium alloys, AZ80 and ZK60, comparative characteristics were obtained for notched and unnotched material in rotating beam bending, and in axial loading fatigue, as well as in static tensile testing. In the unnotched condition the AZ80 alloy showed a slightly higher static tensile strength than that of ZK60, whereas in the notched condition the tensile strength of AZ80 was lower. The ultimate static tensile strength of unnotched AZ80 was higher than that of notched, but the reverse was true for ZK60 alloy, which indicates a lack of static notch sensitivity. The AZ80 alloy demonstrated higher fatigue strength than the ZK60 in all types of loading in both notched and unnotched conditions, except for reversed axial loading where they were equal in the notched condition. AAF TR 5926.

PLASTIC STRESS-STRAIN RELATIONS FOR COMBINED TENSION AND COMPRESSION, by Joseph Marin and H.A.B. Wiseman. U. S. National Advisory Committee for Aeronautics. Jul 1952. 61p photos, diagr, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N.W., Washington 25, D. C. PB 107218

Plastic stress-strain relations for biaxial tension-compression principal stresses were determined for a 14S-T4 aluminum alloy. Constant-stress-ratio tests provided control data and information on the influence of biaxial stresses on the yield strength of the material. Variable-stress-ratio tests were made to determine whether the deformation or flow theory agrees better with actual plastic stress-strain relations and special tests were conducted to check the validity of various assumptions made in these theories. NACA TN 2737.

PREVIEW OF BEHAVIOR OF GRAIN BOUNDARIES IN CREEP OF ALUMINUM BICRYSTALS, by F. N. Rhines and A. W. Cochardt. U. S. National Advisory Committee for Aeronautics. Jul 1952. 40p photos, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107221

Gliding of aluminum bicrystals along their mutual boundary was studied during creep tests at 200° to 650°C and 1 to 100 psi. The direction of motion depends only upon the direction of maximum resolved shear stress in the boundary plane. The magnitude of the motion increases with magnitude of resolved shear stress, temperature, and degree of mismatch between orientations of the crystals. Gliding rate is cyclic and for each temperature there is a stress below which gliding does not occur. At low temperature and small orientation difference an induction period precedes gliding. Gliding operates in a relatively thick zone of crystalline metal on both sides of the boundary. Portions of the grains away from the boundary degenerate into blocks that move with respect to each other, parallel to the tension axis, and that rotate about octahedral axes of the original crystal. NACA TN 2746.

SPEKTROGRAFISK SLAGG-OCH MALMANALYS (SPECTROCHEMICAL SLAG AND ORE ANALYSIS), by C. Georg Carlsson. 1952. 16p drawing, graphs, tables (Text in Swedish) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107187

A spectrochemical method for slag analysis, previously described in English (1), has been tried for the determination of rock constituents of iron ore concentrates. It was found necessary to incorporate a fluxing operation in order to convert all samples to the same mineralogical state. Among several procedures tried the best was the mixing of 200 mg ore, pulverized to minus 100 mesh, with 1.600 mg of powdered $Na_2B_4O_7$ and melting for 3-4 minutes on a large platinum lid from which the tin cake was easily removed after solidification. Summary in English. Meddelande fran Metallografiska Institutet. Reprinted from Jernkontorets annaler vol. 135, 1951, p. 607-620.

STEEL CONSTRUCTION. REPORT OF A VISIT TO THE U.S.A. IN 1951 OF A PRODUCTIVITY TEAM ON CONSTRUCTIONAL STEELWORK, FABRICATED PLATEWORK MECHANICAL HANDLING PLANT. Anglo-American Council on Productivity. Jul 1952. 75p photos, map, drawings Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 106459

1. Steel construction 2. Steel - Specifications 3. Bridges, Steel 4. Buildings, Steel.

UNDERSÖKNINGAR ÖVER STALS INTRÄNGNING I FORMMASSOR (INVESTIGATION ON PENETRATION OF LIQUID STEEL IN MOLDING SAND), by Holger Pettersson. 1951. 43p photos, diagrs,

graphs (Text in Swedish) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107189

The penetration of liquid steel in sand molds was studied by immersing cylindrical test pieces of molding sand into liquid steel in a high frequency furnace. The influence of steel composition, temperature and pressure and of grain size and grain size distribution of the sand as well as mold composition, ramming density and sintering temperature was investigated. Summary in English. Meddelande fran Metallografiska Institutet. Reprinted from Jernkontorets annaler, vol. 135, 1951, p. 1-43.

WEAR AND SLIDING FRICTION PROPERTIES OF NICKEL ALLOYS SUITED FOR GAGES OF HIGH TEMPERATURE ROLLING-CONTACT BEARINGS. I: ALLOYS RETAINING MECHANICAL PROPERTIES TO 600° F, by Robert L. Johnson, Max A. Swikert and Edmond E. Bisson. U. S. National Advisory Committee for Aeronautics. Aug 1952. 30p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107281

Wear and sliding friction properties of a number of nickel alloys operating against hardened SAE 52100 steel were studied. These alloys include "L" nickel, wrought monel, cast monel, cast modified "H" monel, cast "S" monel, Invar, Ni-Resist 3, and Nichrome V. Some of the alloys studied may be useful as possible cage material for high-temperature, high-speed bearings for aircraft turbines or for bearings to operate in corrosive media. Desirable operating properties of all the materials could be associated with the development on the rider surface of a naturally formed film of nickel oxide. On the basis of wear and friction properties, Ni-Resist 3, modified "H" monel, and Invar were the best materials studied in this investigation although they did not perform as well as nodular iron. "L" nickel performed well with light loads but was not effective at higher loads when the surface film broke down. For part II see PB 107282. NACA TN 2758.

WEAR AND SLIDING FRICTION PROPERTIES OF NICKEL ALLOYS SUITED FOR CAGES OF HIGH-TEMPERATURE ROLLING-CONTACT BEARINGS. II: ALLOYS RETAINING MECHANICAL PROPERTIES ABOVE 600°F, by Robert L. Johnson, Max A. Swikert and Edmond E. Bisson. U. S. National Advisory Committee for Aeronautics. Aug 1952. 29p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107282

Wear and sliding friction properties of a number of nickel alloys operating against hardened SAE 52100 steel were studied. The alloys were cast beryllium nickel, heat-treated beryllium nickel, cast Inconel, Nimonic 80, Inconel X, Refractalloy 26, and Discaloy. Some of the alloys studied may be useful as material for cages of rolling-contact bearings that operate at high speeds with temperatures above 600°F in projected aircraft turbine engines or for bearings that operate in corrosive mediums. Desirable operating properties and the absence of extreme mass welding of all the materials studied could be associated with the development of the sliding surfaces of a naturally formed film of nickel oxide. On the basis of wear and friction properties, cast Inconel performed very well in these experiments and compares favorably with nodular iron. Nimonic 80 also showed promise as a possible cage material. For Pt I see PB 107281. NACA TN 2759.

Meteorology and Climatology

PROJECT CIRRUS. OCCASIONAL REPORT NO. 34: THIN FILMS OF SUPERSATURATED SOLUTIONS FOR DETECTING, COUNTING, AND IDENTIFYING VERY SMALL CRYSTALLINE PARTICLES, by Bernard Vonnegut. General Electric Co. Research Laboratory, Schenectady, N. Y. Apr 1952. 10p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107091

1. Particles - Counting 2. Aerosols - Detection 3. Solids - Crystal structure 4. GE RL 677 5. SIG Contract DA-36-039-sc-15345, Occasional report no. 5.

Presented before the Conference on Interfacial Phenomena and Nucleation, Boston University, Aug 21, 1951. Fifth occasional report under Contract no. DA-36-039-sc-15345. Army project: 3-90-07-022. Signal Corps project: 24-172B-0.

PROJECT CIRRUS. QUARTERLY PROGRESS REPORT NO. 18, JAN 1-APR 1, 1952, by Vincent J. Schaefer. General Electric Co. Research Laboratory, Schenectady, N. Y. Apr 1952. 5p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107182

1. Meteorological research 2. Clouds - Formation 3. SIG Contract DA36-039-sc-15345, Report no. 3.

Third quarterly progress report issued under Contract no. DA36-039-sc-15345.

Minerals and Mineral Products

ELECTRICAL PROPERTIES OF THE INORGANIC PAPERS, by Thomas D. Callinan. U. S. Naval Research Laboratory. Jun 1952. 10p graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.25. PB 111017

The electrical properties of asbestos, mica, ceramic, glass, and silica fiber papers have been studied for possible use as thermally stable insulants. The dielectric constants of the synthetic fiber inorganic papers are of the order of 1.05 - 1.15; the densities are correspondingly low (0.2 - 0.3 gm/cc). The dielectric constants of the naturally occurring inorganic papers are higher (3.5) due to the correspondingly higher densities. The electrical losses are lowest in the synthetic base papers (0.0001) and highest in the asbestos products (0.6). NRL R4005.

Packing and Packaging

SET, GAS, TOXIC, E11. INTERIM REPORT, by Milton A. Raun. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Jun 1952. 9p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25.
PB 107185

1. E11 (Toxic gas set) 2. Chemical warfare agents - Shipping 3. Mustard gas - Containers 4. CC CRL IR 156.

Project 4-91-06-001.

Paper and Allied Products

DETERMINATION OF COPPER IN PULP AND PAPER. INVESTIGATION OF A NEW REAGENT FOR COPPER, by Carl-Ulrik Wetlesen and Gunnar Gram. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1952. 5p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107226

During the course of work on oxalyldihydrazide, Nilsson (1) found that bis-cyclohexanone-oxalyldihydrazone (C_6H_{10}:N.NH.CO.CO.NH.N:C_6H_{10}) gives a very sensitive colour reaction with copper. The purpose of the work described here was to examine the usefulness of the reagent for the quantitative determination of small amounts of copper, especially in pulp and paper. Summaries in Swedish and German Reprinted from Svensk Papperstidning vol. 55, 1952, p. 212-216. Svenska Träforskningsinstitut. Träkemi och Pappersteknik. Meddelande 100.

DETERMINATION OF LIGNIN IN CHEMICAL WOOD PULP. I: PRINCIPLES AND METHODS, by Per Olof Bethge, Gunnar Gran and Karl Erik Ohlsson. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1952. 5p graphs, table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107242

It has been shown that it is possible to determine the lignin content of chemical pulps by dissolving them in 80 percent phosphoric acid and measuring the absorbancy. Beer's law is valid over an appreciable concentration range and the absorbancy values are reproducible. Summaries in German and Swedish. Reprinted from Svensk Papperstidning, vol. 55, 1952, p. 44-48. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 99.

FIBER STRUCTURE AND PULP PROPERTIES. II: THE INFLUENCE OF ULTRASONIC TREATMENT ON WOOD CELLULOSE FIBERS, by William H. Algar and Hans Wilhelm Giertz. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1952. 8p photos Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107225

The ultrasonic treatments were made with a Philips ultrasonic generator operating at 22 kcs. with an electric output of 750 watts to a magnetostrictive unit. The pulps used in the experiments were laboratory pulps all prepared from the same wood sample-- Swedish spruce (Picea excelsa). Summaries in Swedish and German. For Part I see PB 106515. Reprinted from Svensk Papperstidning vol. 54, 1951, p. 693-700. Svensk Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 91.

NEW ELECTROCHEMICAL RECORDER PAPER, by E. J. Kohn, D. L. Venezky, R. G. Rice, F. J. Ross and G. F. Asbury, Sr. U. S. Naval Research Laboratory. Jul 1952. 17p photos, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111021

A new electrolytic electrochemical recorder paper utilizing a benzidine marking agent has been developed which has high sensitivity, wide dynamic range, and fine recording definition. The paper is further characterized by good wet strength and stability with respect to shelf-life and to aging of the recorded paper. The recording process is an oxididation reaction which permits the use of chemically inert, noncorrosive metal stylus or printing bar materials. The resultant blue marking provides high optical contrast with the light buff background. Experimental rolls of this recorder paper have been prepared in a continuous process by precipitating benzidine on and into the paper as the highly insoluble sulfate salt in the first two baths and adding in the third bath the inorganic salts which function as buffering agents and electrolytes to provide electrical conductance. The paper is then adjusted to the proper moisture content and wound into rolls which are sealed in polythene bags and stored in sealed metal containers. NRL R 4001.

OPACITETEN HOS PAPPERSMASSOR. III: SULFITMASSOR (OPACIFYING PROPERTIES OF SULFITE PULPS), by Hans Wilhelm Giertz. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1952. 7p graphs, tables (Text in Swedish) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107250

The influence of sulfite cooking on the opacity of the pulp was studied using pulps prepared under widely differing cooking conditions. The pulps were delignified with acid chlorite solutions, and the specific scattering coefficient estimated with sheets made from both wet and dried pulps. Cooking conditions and analysis data are listed in tables. Abstracts in English and German. Table headings and graph titles in English. Reprinted from Svensk Papperstidning 54 (1951) 769-775. For pt. II see PB 106511; for IV see PB 107251. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 92.

OPACITETEN HOS PAPPERSMASSOR. IV. SULFATMASSOR (OPACIFYING PROPERTIES OF SULFATE PULPS), by Hans Wilhelm Giertz. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1952. 6p graphs, tables (Text in Swedish) Available from Library of Congress, Photoduplication Section, Wash-

ington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107251

The influence of cooking conditions on the opacity of the sulfate pulps was studied. Both the cooking time and the amount of total alkali were varied. Some pulps were bleached with chlorine and hypochlorite whereas others were delignified with acid chlorite solutions. The specific scattering coefficient was determined with sheets made from both wet and dried pulps. Cooking conditions and analysis data are listed in tables. Abstracts in English and German. Table headings and graph titles in English. Reprinted from Svensk Papperstidning 55, (1952) 72-77. For pt. II see PB 106511; for pt. III see PB 107250. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 93.

Personnel Aptitude Testing

FACTOR-ANALYTIC STUDY OF NAVY REASONING TESTS WITH THE AIR FORCE AIR CREW CLASSIFICATION BATTERY. STUDIES OF APTITUDES OF HIGH-LEVEL PERSONNEL, by J. P. Guilford, R. F. Green, P. R. Christensen, A. F. Hertzka, N. W. Kettner. University of Southern California. Jun 1952. 23p tables Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.00, Photostat $3.75. PB 107205

1. Psychological tests 2. Ability tests 3. UCLA PL no. 6.

Contract N6 onr-23810. See also PB 103856-103857, 107206-107207.

FACTORIAL COMPARISONS OF TWO AIRCREW CLASSIFICATION BATTERIES WITH AND WITHOUT THE VARIABLE OF PREVIOUS FLYING EXPERIENCE, by Virginia Zachert and Gabriel Friedman. U. S. Air Training Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Apr 1952. 22p tables Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.00, Photostat $3.75. PB 107234

1. Personnel, Flying - Ability tests 2. Personnel, Flying - Classification 3. Psychological tests 4. Keesler Field battery (Psychological test) 5. AAF HRRC RB 52-16.

NEUROPSYCHIATRIC SELECTION AS A CONTRIBUTION TO MILITARY EFFICIENCY, by William A. Hunt. Northwestern University, Evanston, Illinois. 1952. 8p Available from Northwestern University, Evanston, Ill. PB 107181

This shows the value of the Navy's neuropsychiatric program in reducing subsequent neuropsychiatric attrition during service. The validity of the psychiatric interview as a selection technique is established. Interesting data concerning hidden costs in the utilization of psychiatrically marginal men is revealed. The value of the experimental approach to the question of military manpower is demonstrated. The value of the application of scientific methodology with a scientific solution is shown.

Photographic and Optical Goods

COMPARISON OF THE AUDIO AND VIDEO ELEMENTS OF INSTRUCTIONAL FILMS (RAPID MASS LEARNING), by H. E. Nelson, K. R. Moll, N. Jaspen. Pennsylvania State College, State College, Pa. Nov 1950. 16p tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 105799

1. Motion pictures, Educational 2. Motion pictures, Sound 3. Psychology, Applied 4. SDC TR 269-7-18.

Contract N6onr-269, T. O. VII, Project NR 781-005. SDC Human Engineering Project 20-E-4.

FILM ANALYZER (RAPID MASS LEARNING), by C. R. Carpenter, R. C. Eggleton, F. T. John and J. B. Cannon, Jr. Pennsylvania State College, State College, Pa. Oct 1950. 18p photos, diagrs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 105796

1. Motion pictures, Educational 2. Recorders, Electrical 3. Motion pictures - Evaluation 4. SDC TR 269-7-15.

Contract N6onr-269, T. O. VII, Project NR781-005. SDC Human Engineering Project 20-E-4.

PHYSICS OF NIGHT AERIAL PHOTOGRAPHY, by T. R. Cooney. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. May 1950. 21p diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.00, Photostat $3.75. PB 107263

A study was made of the physics of night aerial photography to establish conditions which will permit the full utilization of the light output of a photoflash bomb or cartridge. The minimum scene illumination required to produce a usable negative was established from analysis of photographs taken under known conditions. Optimum conditions of aircraft altitude and bomb-burst altitude were determined from the above information. Procedures are outlined which make it possible to calculate those conditions under which the most efficient performance of any light source-camera combination is realized. AAF TR 5801.

RELATIVE EFFECTIVENESS OF INSTRUCTION BY: FILMS EXCLUSIVELY, FILMS PLUS STUDY GUIDES, AND STANDARD LECTURE METHODS (RAPID MASS LEARNING), by Abram W. Vander Meer. Pennsylvania State College, State College, Pa. Jul 1950. 51p tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 105794

1. Motion pictures, Educational 2. Psychology, Applied 3. SDC TR 269-7-13.

Contract N6onr-269, T. O. VII, Project NR781-005. SDC Human Engineering Project 20-E-4.

SURVEY PHOTOGRAPHY RESEARCH. Canada. Royal Canadian Air Force. Air Materiel Command. Jul 1952. 3p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107248

1. Photography, Aerial - Research - Canada
2. Mapping, Aerial - Canada.

AMC experimental project 38/52.

Physics

General

APPLICATION OF THE FRANCK-CONDON PRINCIPLE TO COMPLEX SYSTEMS, by Melvin Lax. U. S. Naval Research Laboratory. Jun 1952. 22p diagr Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C. Mimeo: $.75. PB 111016

The semiclassical Franck-Condon principle is derived from the usual quantum-mechanical transition probability by the application of a mean-value theorem and closure to the summation over final and initial vibrational states. In order to provide an accuracy test of the semiclassical formula as well as to lay the groundwork for a number of important applications, the following problem was considered: Absorption or emission by a complex system whose vibrational states are describable by normal modes, such that the configurational energy difference between the two electronic states can be approximated by a linear expression in the normal coordinates. (The last assumption often corresponds to the maximum accuracy with which the electronic energy can be computed). It was found possible to solve this basic problem in closed form using quantum-mechanical as well as semiclassical procedures. The semiclassical Franck-Condon principle yielded a Gaussian absorption (or emission) spectrum whose mean value (~ peak) and breadth were in exact agreement with the corresponding quantum-mechanical parameters. The quantum-mechanical spectrum, however, is not precisely Gaussian. It possesses a skewness (third moment) that is positive for absorption and negative for emission (i.e., the high-energy tail is longer on absorption). This effect is produced by the Stokes rule, which states that it is easier to emit a phonon than absorb one. And the kurtosis of the quantum-mechanical curve (fourth moment) is larger than that expected for a Gaussian. Thus for the same rms width, the quantum-mechanical curve is flatter and longer-tailed. Another problem that has been investigated is the extent to which a complex system can, be replaced by a one-parameter system. It was established that a one-parameter description is possible if the energy separation between the two electronic states (whether linear or not) is a function only of a single parameter. It was demonstrated, however, by comparison with the exact calculations mentioned above, that the effective resonance frequency of the one-parameter (harmonic oscillator) system would be temperature dependent. Approximate calculations are made for this resonant frequency when the energy difference between the two electronic states contains a quadratic term. NRL R 3973.

FUEHRER DURCH DIE STROEMUNGSLEHRE (GUIDE TO FLOW THEORY), BY LUDWIG PRANDTL. TRANSLATED FROM THE GERMAN. Jun 1949. 395p photos, diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $9.00, Photostat $50.00. PB 107206

The following subjects are discussed relative to flow theory: properties of liquids and gases, kinematics of fluids; dynamics of frictionless fluids; motion of viscous fluids; turbulence; drag; flow with appreciable volume changes (gas dynamics); and various special topics on cavitation, water shock, water-air mixture, solid bodies in flowing water, bodies in accelerated flow, etc. AAF T2 T/3547 RE.

ON THE EXCHANGE OF RADIANT ENERGY BETWEEN THE EARTH AND THE SKY, by Clay P. Butler. U. S. Naval Research Laboratory. Jun 1952. 16p graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111013

Measurements have been made in the wavelength interval 2 to 14 microns of the exchange of spectral radiant flux between the earth and the sky at several zenith angles as a function of time of day or season, and of state of overcast. The following statements are justified by an analysis of the results and apply specifically to the vicinity of Washington, D. C. where the data were taken. 1. There are no marked diurnal variations in the spectrum of the zenith sky in the wavelength interval 3 to 14 microns. 2. At all wavelengths from 3 to 14 microns the net flow of energy is from the earth to the sky. 3. This flow of energy is greater in the winter than in the summer. 4. Within this wavelength interval the energy loss from unit subtended area of the earth's surface is greatest toward the zenith and is least toward the horizon. 5. The energy loss under consideration is greatest on clear days, less with high overcast, and least with low overcast. 6. The present spectra show that the transfer of monochromatic radiation between the earth and sky is not inversely proportional to the square root of the air mass. NRL R 3984.

QUELQUES EXPERIENCES SUR LA NON-LINEARITE DES FILS CHAUDS. (SOME EXPERIENCES REGARDING THE NONLINEARITY OF HOT WIRES), by R. Betchov and W. Welling. Jun 1952. 13p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107105

Hot-wire experiments illustrate some differences between the resistance characteristics as given by King's equation and those for a finite wire length. The experiments support previous theoretical work which accounted for a heat loss although the wire ends and a dependence of the convective heat loss on a nonlinear function of the temperature difference between the wire and the air. Technische Hoogenschool te Delft, Laboratorium voor Aero- en Hydrodynamica. Mededeling 66. Translated from Koninklijke Nederlandsche Akademie van Wetenschappen te Amsterdam, Verhandelingen, v. 53, no. 4, 1950, p. 432-439. See also PB 107106. NACA TM 1223.

THREE-DIMENSIONAL BOUNDARY LAYER, by Wallace D. Hayes. U. S. Naval Ordnance Test

Station, Inyokern, California. May 1951. 33p diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107254

The fundamental equations are derived for the three-dimensional laminar boundary layer, using orthogonal curvilinear coordinates. Some of the new features that appear are the dilatation or convergence of external streamlines and the phenomenon of crossflow in the boundary layer. Equations are derived for several specific cases, ranging from the simple body of revolution to the three-dimensional analogue of Karman's integral relations between the shear and the momentum integral. The equations are left in a general form to allow wide range of application. NAVORD 1313. NOTS 384.

TREATMENT OF FOURTH-DEGREE EQUATIONS, by Hans C. Gebelein. U. S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio. May 1950. 22p diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107264

A method of solving fourth-degree equations for the analysis of stability of a mechanical system is outlined, based on the Routh discriminant. The Routh discriminant not only clears up the stability behavior but also provides a resolvent equation of third degree which can be solved numerically. By means of its smallest real solution the exact roots of the frequency equation easily can be expressed. The method is useful for solving all equations of fourth degree. AAF TR 5992.

VELOCITY OF SOUND IN SEA WATER AT ZERO DEPTH, by V. A. Del Grosso. U. S. Naval Research Laboratory. Jun 1952. 42p graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.25. PB 111024

The velocity of sound has been measured in natural sea water samples at megacycle frequencies by means of modern interferometric techniques. From these measurements, an empirical equation has been formulated, and new tables and graphs of the velocity of sound in natural sea water at "zero" depth are presented on the basis of this equation. The validity of utilizing these velocity tables at sonar frequencies is based on theoretical work which indicates the error introduced by so doing is at least an order of magnitude smaller than the claimed accuracy. The accuracy of these tables is estimated to be within ±0.2 meter per second. The velocity values range approximately 2-4 meters per second higher than those in existing tables. NRL R 4002.

Psychology

CONSTRUCTION OF HOMOGENEOUS KEYS FOR A BIOGRAPHICAL INVENTORY, by Philip H. DuBois, Jane Loevinger, and Goldine C. Gleser. U. S. Air Training Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. May 1952. 22p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107279

This bulletin describes research on a relatively new technique for scoring or "keying" Biographical Inventories. This procedure, termed "homogeneous keying," involves development of scores in terms of unitary personal characteristics as revealed by replies to items in the Biographical Inventory. There is reason to believe that such homogeneous keys will provide for improved classification, as compared to the more traditional "empirical keys" currently in use. Contract AF33(038)-10588. Project no. 503-001-0011. AAF HRRC RB 52-18.

EFFECTS OF FILM-VIEWING PRACTICE ON LEARNING FROM INSTRUCTIONAL FILMS (RAPID MASS LEARNING), by A. W. Vander Meer. Pennsylvania State College, State College, Pa. Nov 1951. 14p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111008

1. Motion pictures, Educational 2. Psychology, Applied 3. SDC TR 269-7-20.

Contract N6onr-269, T. O. VII, Project NR-781-005. SDC Human Engineering project 20-E-4.

FACTOR-ANALYTIC STUDY OF EVALUATIVE ABILITIES. I: HYPOTHESES AND DESCRIPTION OF TESTS. STUDIES OF APTITUDES OF HIGH-LEVEL PERSONNEL, by J. P. Guilford, A. F. Hertzka, R.M. Berger, P. R. Christensen. University of Southern California. Psychological Laboratory, Los Angeles, California. Jul 1952. 19p drawings Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107206

In connection with a comprehensive research project on the aptitudes of high-level personnel, this paper reports the hypotheses and tests developed for a study of evaluative abilities by means of factor analysis. The term "evaluation" is adopted, because most definitions found in the literature for the more common term "judgment" are too narrow or abstract for the purposes of this investigation. Exceptions to this are the definitions formulated in the Army Air Forces research of World War II. Evaluation is defined as an awareness of the agreement of an object, situation, conclusion, or creation with a standard or criterion of suitability or goodness. The hypotheses are constructed in terms of differences between evaluative performances. Evaluative performances vary in several respects which can be paired roughly as follows: (1) logical vs. practical considerations; (2) formal vs. informal context; (3) perceptual vs. conceptual task; (4) power vs. speed condition; and (5) choice vs. completion test format. It is assumed that different evaluative abilities are called upon as the task is varied. In accordance with this and with previous factorial findings, the hypotheses are arranged in the following four groups: (1) conceptual evaluation primarily in terms of logical necessity (three sub-hypotheses; based on the logical-reasoning factor); (2) conceptual evaluation primarily in terms of practical feasibility, experience, and social custom (three sub-hypotheses; based on the judgment factor); (3) perceptual evaluation in terms of logical necessity and experience (two sub-hypotheses; based on the

judgment factor); and (4) speed of evaluation (two sub-hypotheses; based on the speed-of-judgment factor). Thirty-six tests have been constructed, adapted, or selected to test the hypotheses. The battery also contains 11 reference tests to define seven factors not in the domain of evaluation. To test hypothesis (5) three pairs of comparable tests, one of which is in multiple-choice, and the other in completion form in each pair, are included in the battery. All tests are described in the report, arranged in the order of the hypotheses. For every test, the nature of the task is explained and for most a sample item is given. In addition, the number of separately timed parts, the number of items per part, and the working time are listed. Contract N6 onr-23810. See also PB103856-103857, 107205, 107207. UCLA PL no. 7.

FACTOR-ANALYTIC STUDY OF CREATIVE THINKING. II: ADMINISTRATION OF TESTS AND ANALYSIS OF RESULTS. STUDIES OF APTITUDES OF HIGH-LEVEL PERSONNEL, by J. P. Guilford, R. C. Wilson, P. R. Christensen. University of Southern California. Jul 1952. 24p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107207

A battery of tests covering eight abilities hypothesized as being important in creative thinking was assembled and administered to 410 Air Cadets and Student Officers. The scores were intercorrelated and sixteen factors were extracted by Tucker's IBM adaptation of Hotelling's principal-components method. Orthogonal rotations resulted in 14 readily identifiable factors, a doublet, and a residual. Nine previously identified factors were found: verbal comprehension, numerical facility, perceptual speed, visualization, general reasoning, word fluency, associational fluency, ideational fluency, and a factor combining Thurstone's closure I and II. Five new factors were identified: (1) originality, a bi-polar factor with ability to produce uncommon, clever or remote responses as the positive side; (2) redefinition, ability to shift the function objects and use them in a new way; (3) adaptive flexibility, ability to change set to meet new requirements imposed by changing problems - a bi-polar factor; (4) spontaneous flexibility, ability to change set in a situation in which the direction of set change is unrestricted; (5) sensitivity to problems, ability to recognize practical problems. Contract N6 onr-23810. See also PB 103856-103857, 107205-107206. UCLA PL no. 8.

Rubber and Rubber Products

EINE NEUE CHEMIE DES ACETYLENS UND KOHLENOXYDS (NEW CHEMISTRY OF ACETYLENES AND CARBON MONOXIDES), by Walter Reppe. I. G. Farbenindustrie, A. G., Ludwigshafen, Ger. Jul 1946. 321p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $9.00, Photostat $41.25. PB 18953s2

1. Acetylene chemistry - Germany 2. Butadiene - Synthesis - Germany 3. Carbon monoxide - Reactions - Germany 4. Carbony..tion - Research - Germany.

For report based on translation of part of this report see BIOS FR 266 (18953).

EINFLUSS VON MOLEKULAREM UND ATOMAREM SAUERSTOFF AUF DIE EMULSIONSPOLYMERISATION, BY HERR HEUCK AND HERR TILK. I: KORREFERATE ZUM REFERAT, VON DR. LOGEMANN. 2: VERSUCHE ZUR FRAKTIONIERUNG VON BUNA- UND NATURKAUTSCHUK-LÖSUNGEN, VON DR. SCHNEIDER, DISKUSSIONSBEMERKUNG ZUM REFERATE. (EFFECT OF MOLECULAR AND ATOMIC OXYGEN ON THE EMULSION POLYMERIZATION. 1: SUPPLEMENT TO THE REPORT, BY DR. LOGEMANN. 2. EXPERIMENTS ON THE FRACTIONATION OF BUNA AND NATURAL LATEX SOLUTIONS, BY DR. SCHNEIDER, DISCUSSION ON THE REPORT) AUG 1940. 11p (Text in German and English) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107180

This supplement of the report "Effect of molecular and atomic oxygen on the emulsion polymerization" confirms an observation on the shortening of the latent period of the emulsion polymerization of styrene under a nitrogen atmosphere. Tests were carried out using styrene, paraffin-fatty acid, water, sodium hydroxide, and potassium persulfate at a polymerization temperature of 30°C. Among the topics covered are those on polymerization velocities under nitrogen or oxygen atmospheres, the emulsion polymerization of chloropren in the presence of hydrosulfite, the polymerization of vinyl compounds, the production of polystrene EF, and the nitrogen rinsing of the polymerization kettle. Translated and edited by Charles A. Meyer & Company, New York 17, N.Y., 16 May,1947. This report includes only the supplement and discussion of the paper before the Wissenschaftlichen Austausch der Kautschuk-Kommission, 15 Juni 1940. Portions of the English translation will not reproduce well. AAF T-2 T/F-TS-3456-RE.

GOVERNMENT DEPARTMENT SPECIFICATION FOR GENERAL STORES: PLAIN RUBBER TUBING. GT. BRIT. MINISTRY OF SUPPLY. TECHNICAL COORDINATING COMMITTEE ON GENERAL STORES. REPRINTED. 1952. 4p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. PB 107082

1. Tubing, Rubber - Specifications - Gt. Brit. 2. MS TGS 49-1935.

T.G. 49-1935. Original publication date was 1935. 70-9999.

PROPERTIES OF BUNA S, SS, SR, S3 AND SW. I.G. Farbenindustrie, A. G., Leverkusen, Ger. 1942-1945. 13p diagrs, graphs (Text in German and English) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107199

1. Buna S (Trade name) 2. Buna SR (Trade name) 3. Buna SS (Trade name) 4. Buna S3 (Trade name) 5. Buna SW (Trade name) 6. Rubber, Buna - Properties - Germany.

Pages numbered 926-6-932.

SOME STUDIES OF LOW-PRESSURE LAMINATION OF MELAMINE RESINS. TECHNICAL REPORT NO.

2 ON RESEARCH CONTRACT N8-ONR-504, TASK ORDER NO. 1, AMENDMENT NO. 1, PROJECT NO. NR033-248, by R. G. Nelb and P. M. Elliott. United States Rubber Co. Naugatuck Chemical Division, Naugatuck, Conn. May 1950. 21p drawing, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107171

Fiberglas laminates have been prepared at 50 p.s.i. and lower using commercial melamine-formaldehyde resins. The results indicated that for most of the physical properties measured, there was little or no differences between the low-pressure and conventional high-pressure laminates.

THERMAL STABILITY OF POLYESTER-STYRENE RESIN SYSTEMS. TECHNICAL REPORT ON RESEARCH CONTRACT N8-ONR-504, TASK ORDER NO. 1, PROJECT NO. NR033-248, by R. S. Holdsworth, H. W. Robinson, E. S. Ebers, W. F. Brucksch, Jr., P. M. Elliott. United States Rubber Co. Naugatuck Chemical Division, Naugatuck, Conn. Mar 1949. 25p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.00, Photostat $3.75. PB 107176

1. Resins - Heat resistance 2. Styrene - Derivatives 3. Laminates, Heat resistant.

Structural Engineering

GENERAL THEORY OF PRETWISTED BEAMS AND COLUMNS, by J. Zickel. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jun 1952. 43p diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107229

A pretwisted structural member of thin-walled section, with slight initial bending, is analyzed in terms of stresses along and perpendicular to the fibers. After proper transformations, these stresses are integrated over the cross-section, and the resulting stress-couples are equated to the external moments and moments due to external forces. The derived equations are a set of simultaneous equation in the three variables of lateral displacement and additional twist. Problems involving pretwisted beams and columns are defined by these equations if appropriate external forces and moments and boundary conditions are prescribed. Report of research under Contract N7onr-35801, T. O. I, NR-041-032 and a grant from the Column Research Council and the Rhode Island Dept. of Public Works. GDAM A11-73. GDAM TR 73.

Textiles and Textile Products

DEVELOPMENT OF A SEWABILITY TEST FOR COTTON FABRICS, by E. B. Frederick. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. May 1952. 19p photos, graph, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.50. PB 111023

The development of the seam efficiency test to measure the sewability of a fabric is described. It is shown that this test, which involves the establishment of a ratio between the strength of the original fabric and the strength of the seamed fabric, is more realistic, reproducible, and sensitive than the previous test which rated a fabric for sewability on the basis of the number of fabric yarns cut per inch during the sewing operation. QMC TSR 73.

Transportation Equipment

Aeronautics

Aircraft

ANALYSIS OF THE NORMAL ACCELERATIONS AND AIRSPEEDS OF A TWO-ENGINE TYPE OF TRANSPORT AIRPLANE IN COMMERCIAL OPERATIONS ON ROUTES IN THE CENTRAL UNITED STATES FROM 1948 TO 1950, by Walter G. Walker and Paul W. J. Schumacher. U. S. National Advisory Committee for Aeronautics. Jul 1952. 30p graphs, diagrs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107156

Normal-acceleration and airspeed data obtained from a two-engine type of transport airplane are analyzed to determine the gust and gust-load experiences of the airplane. The gust and gust-load experiences are compared with similar results from the same type of airplane during past operations. The influences of the gusts and the operating speeds in rough air on the gust-load experience are indicated. NACA TN 2735.

BLADE-ELEMENT ANALYSIS FOR LIFTING ROTERS THAT IS APPLICABLE FOR LARGE INFLOW AND BLADE ANGLES AND ANY REASONABLE BLADE GEOMETRY, by Walter Castles, Jr. and Noah C. New. U. S. National Advisory Committee for Aeronautics. Jul 1952. 63p drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107173

A blade-element analysis for lifting rotors is presented which is applicable for large inflow and blade angles and any reasonable blade geometry and should therefore be useful for convertaplane as well as helicopter calculations. Simple approximate relations between rotor thrust and flight-path velocity components and rotor blade angles, torque, and in-plane forces are derived and these solutions, based on the assumption of a triangular distribution of blade circulation and a parabolic variation of profile drag with lift, are sufficiently accurate for preliminary calculations and determination of equilibrium angle of attack and lateral tilt of the tip-path plane. More exact blade-element equations are then derived for the relations between thrust and flight-path velocity components and equilibrium blade angles, torque, and in-plane forces and moments. NACA TN 2656.

CHARTS AND APPROXIMATE FORMULAS FOR THE ESTIMATION OF AEROELASTIC EFFECTS ON THE LATERAL CONTROL OF SWEPT AND UNSWEPT WINGS, by Kenneth A. Foss and Franklin W. Diederich. U. S. National Advisory Committee for Aeronautics. Jul 1952. 71p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107280

Charts and approximate formulas are presented for the estimation of static aeroelastic effects on the spanwise lift distribution, rolling-moment coefficient, and rate of roll due to aileron deflections on swept and unswept wings at subsonic and supersonic speeds. Some design considerations brought out by the results of this paper are discussed. NACA TN 2747.

EXPERIMENTS IN EXTERNAL NOISE REDUCTION OF A SMALL PUSHER-TYPE AMPHIBIAN AIRPLANE, by John P. Roberts and Leo L. Beranek. U. S. National Advisory Committee for Aeronautics. Jul 1952. 142p photos, graphs, diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107139

As part of a program to find practicable ways of reducing the external noise level of light airplanes, noise measurements were made on a representative pusher-type amphibian airplane. Tests were made with a standard airplane and with modified versions of the airplane equipped with a geared engine, exhaust muffler, and propellers with various numbers of blades. Sound-level recordings were made of take-offs; of overhead flights at 100- and 500-foot altitude; and, for some configurations, of flights at 500-foot altitude passing 3000 feet away. The tests also included analyses of sound-frequency components with the airplane on the ground from a distance of 50 feet and at various positions around the airplane. The results are compared with measurements from a previous noise study of a tractor-type airplane. NACA TN 2727.

FLIGHT MEASUREMENTS OF THE PRESSURE DISTRIBUTION ON A TEMPEST WING UP TO A MACH NUMBER OF 0.8, by K. Eyre. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Dec 1946. 15p drawings, diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 107129

1. Mach number - Effect - Gt. Brit. 2. Airfoils - Pressure distribution - Gt. Brit. 3. Wings - Pressure distribution - Gt. Brit. 4. Tempest (Airplane) 5. Fury (Airplane) 6. Hawker Aircraft, Limited 7. ARC RM 2489.

Cover date is 1952. S. O. Code no. 23-2489.

HARVARD 4: RELOCATING COCKPIT LIGHTS. Canada. Royal Canadian Air Force. Air Materiel Command. Jul 1952. 4p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107247

1. Cockpits - Lights - Canada 2. Harvard 4 (Airplane).

AMC experimental project 34/52.

INVESTIGATION OF THE INFLUENCE OF FUSELAGE AND TAIL SURFACES ON LOW-SPEED STATIC STABILITY AND ROLLING CHARACTERISTICS OF A SWEPT-WING MODEL, by John D. Bird, Jacob H. Lichtenstein and Byron M. Jaquet. U. S. National Advisory Committee for Aeronautics. Jul 1952. 18p graphs, diagrs, photo Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107175

Results are presented of a wind-tunnel investigation to determine influence of the fuselage and tail on static stability and rotary derivatives in roll of a model having 45° sweptback wing and tail surfaces. The wing alone and the model without the horizontal tail showed marginal longitudinal stability near maximum lift. The longitudinal stability of the complete model was satisfactory. The vertical tail produced larger increments of rate of change of lateral-force and yawing-moment coefficients with wing-tip helix angle than the fuselage or the horizontal tail. NACA TN 2741.

MEASUREMENTS OF FLYING QUALITIES OF AN F-47D-30 AIRPLANE TO DETERMINE LATERAL AND DIRECTIONAL STABILITY AND CONTROL CHARACTERISTICS, by R. Fabian Goranson and Christopher C. Kraft, Jr. U. S. National Advisory Committee for Aeronautics. Jul 1952. 61p photos, drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107244

Tests have been made of the flying qualities of an F-47D-30 airplane to determine the lateral and directional stability and control characteristics. Data are also presented of the aileron hinge-moment characteristics. NACA TN 2675.

METHOD FOR DETERMINING THE WATER STABILITY OF A SEAPLANE IN TAKE-OFF AND LANDING, by H. G. White and A. G. Smith. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1943. 12p graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 107136

This report gives a method of analysis of take-off records of altitude against speed, and results obtained by this method are compared with the steady-run results. Cover date is 1952. S. O. Code no. 23-2719. ARC RM 2719.

METHOD OF SELECTING THE THICKNESS, HOLLOWNESS, AND SIZE OF A SUPERSONIC WING FOR LEAST DRAG AND SUFFICIENT BENDING STRENGTH AT SPECIFIED FLIGHT CONDITIONS, by James L. Amick. U. S. National Advisory Committee for Aeronautics. Jul 1952. 38p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107246

The method described, which is suitable for use in preliminary missile design, is based on simple beam theory and takes into account the effects of wing weight and type of skin thickness distribution. For cases in which the wing weight is negligible, a simplification of the general method gives the best lift-

drag ratio consistent with the bending strength requirement of a given combination of plan form and profile shape at a given Mach number as a function of a single design parameter. An example of the application of the method to a diamond wing at Mach number 2.0, for a range of specified flight conditions, is presented. NACA TN 2754.

NOTE ON THE FRISE AILERON, by H.H.B.M. Thomas and E. R. Crabbe. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1946. 16p diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 107132

The present note, besides giving a general discussion of the characteristics of Frise ailerons, includes a method of estimating the hinge moment from the hinge moment of the unbalanced ailerons. Means of improving the hinge-moment characteristics, avoiding oscillation, and increasing the rolling power of Frise ailerons are also discussed. Cover date is 1952. S. O. Code no. 23-2502. ARC RM 2502.

NUMERICAL DETERMINATION OF INDICIAL LIFT AND MOMENT FUNCTIONS FOR A TWO-DIMENSIONAL SINKING AND PITCHING AIRFOIL AT MACH NUMBERS 0.5 AND 0.6, by Bernard Mazelsky and Joseph A. Drischler. U. S. National Advisory Committee for Aeronautics. Jul 1952. 37p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107219

Approximate values for the indicial lift and moment functions on a sinking and pitching airfoil are calculated for Mach numbers 0.5 and 0.6. The indicial lift function associated with an airfoil penetrating a sharp-edge gust is also determined approximately at Mach numbers 0.5, 0.6 and 0.7. NACA TN 2739.

POSSIO'S SUBSONIC DERIVATIVE THEORY AND ITS APPLICATION TO FLEXURAL-TORSIONAL WING FLUTTER, by R. A. Frazer and Sylvia W. Skan. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1942. 22p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.40. PB 107133

1. Possio integral equation (Aerodynamics) - Gt. Brit. 2. Wings - Flutter - Calculations - Gt. Brit. 3. Wings - Flutter, Flexural-torsional - Gt. Brit. 4. Wings, Cantilever - Flutter - Gt. Brit. 5. Wings - Compressibility effect - Gt. Brit. 6. Velocity, Subsonic - Theory - Gt. Brit. 7. Airfoils - Compressibility effects - Gt. Brit. 8. Airfoil theory 9. Torsion - Theory - Gt. Brit. 10. ARC RM 2553.

Cover date is 1951. S. O. Code no. 23-2553. Contents: Part I; Possio's derivative theory for an indefinite aerofoil moving at subsonic speeds, by R. A. Frazer. - Appendix to Part I: Supplementary notes on the theory. Part II: Influence of compressibility on the flexural-torsional flutter of a tapered cantilever wing moving at subsonic speed, by R. A. Frazer and Sylvia W. Skan.

PROBABILITY ANALYSIS OF THE METEOROLOGICAL FACTORS CONDUCTIVE TO AIRCRAFT ICING IN THE UNITED STATES, by William Lewis and Norman R. Bergrun. U. S. National Advisory Committee for Aeronautics. Jun 1952. 93p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107157

Meteorological icing data obtained in flight in the United States are analyzed statistically and methods are developed for the determination of (1) the various simultaneous combinations of the three basic icing parameters (liquid-water content, drop diameter, and temperature) which would have equal probability of being exceeded in flight in any random icing encounter, and (2) the probability of exceeding any specified group of values of liquid-water content associated simultaneously with temperature and drop-diameter values lying within specified ranges. NACA TN 2738.

SUPERSONIC DIFFUSERS, by J. Lukasiewicz. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jun 1946. 30p photo, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.80. PB 107131

Various possible types of supersonic diffuser are considered theoretically and the available experimental evidence is reviewed. The mechanism of the shock wave and boundary-layer interaction is considered. The high performance of multi-shock diffusers is confirmed by Oswatitsch's tests at Göttingen, the results of which are here summarized. The operation of supersonic diffusers at other than the design Mach number is briefly considered. Cover date is 1952. S. O. Code no. 23-2501. ARC RM 2501.

TACTUAL DISCRIMINABILITY OF TWO KNOB SHAPES AS A FUNCTION OF THEIR SIZE, by W. C. Biel, G. A. Eckstrand, Aero Medical Laboratory, and A. D. Swain, A. N. Chambers, Ohio State University. U. S. Air Force. Wright Air Development Center. Research Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1952. 18p photos, diagrs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107252

In order to obtain data concerning the minimum size requirements for adequate tactual discriminability of the wheels and flaps airplane control knobs, five groups of 20 subjects each performed a task which required that they discriminate tactually between these two knob shapes. Subjects were allowed to view a knob shape presented in an aperture for about two seconds. Immediately following this they were required to grasp a lever containing one of the knob shapes. The subject was to "operate" the lever if he thought that the knob shape sampled tactually was the same as the one viewed but was to remove his hand without moving the lever if the thought it was different. Errors of discrimination and total response time for each discrimination were recorded. Five different knob sizes were used and each of the five groups performed the discriminative task with one

of the different knob sizes. The major dimension of the knobs used varied in 1/4 inch steps from 1 inch through 2 inches. Each subject made 48 discriminations. Analyses were made of (1) average number of initially correct responses for each group, (2) average response time for initially correct responses for each group, and (3) average time required to make 48 correct responses for each group. None of these analyses revealed any statistically significant differences among the five knob size groups. Contract AF 33(038)-15474. AAF WADC TR 52-7.

TESTS ON A MODEL BODY-WING COMBINATION AT SUPERSONIC SPEED, by P. J. Wingham. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Dec 1944. 4p drawings, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 107135

1. Wind tunnels, Supersonic - Tests - Gt. Brit. 2. Wings - Lift - Gt. Brit. 3. Model testing - Gt. Brit. 4. Wings - Model tests - Gt. Brit. 5. Airplanes - Models - Tests - Gt. Brit. 6. ARC RM 2711.

Cover date is 1951. S. O. Code no. 23-2711.

THEORETICAL CHARACTERISTICS OF TRIANGULAR-TIP CONTROL SURFACES AT SUPERSONIC SPEEDS. MACH LINES BEHIND TRAILING EDGES, by Julian H. Kainer and Mary Dowd King. U. S. National Advisory Committee for Aeronautics. Jul 1952. 76p diagrs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107245

By means of linearized theory, generalized expressions in closed form have been obtained for the characteristics due to control-surface deflection (C_{l_δ}, C_{l_δ}, C_{m_δ}, and C_{h_δ}) and due to wing angle of attack (C_{h_α}) for wing plan forms having triangular-tip control surfaces at supersonic speeds. The analysis considers wing trailing-edge sweep, control-surface geometry, and Mach number for the deflection characteristics. For C_{h_α}, the effect of wing leading-edge sweep and aspect ratio are also included. The analysis is limited to configurations where the trailing edges are supersonic and where the innermost Mach lines from the leading edge of the control-surface root chord to not intersect the wing root chord. NACA TN 2715.

WIND-TUNNEL TESTS ON THE 30 PER CENT. SYMMETRICAL GRIFFITH AEROFOIL WITH EJECTION OF AIR AT THE SLOTS, by N. Gregory, W. S. Walker and W. G. Raymer. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1946. 11p graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 107127

1. Wind tunnel tests - Gt. Brit. 2. Airfoils, Suction - Multi-slot - Gt. Brit. 3. Airfoils, Symmetrical - Lift - Gt. Brit. 4. Airfoils, Slotted - Wind tunnel tests - Gt. Brit. 5. Griffith aerofoil - Gt. Brit. 6. Slots, Suction - Gt. Brit. 7. Wings, Slotted - Wind tunnel tests - Gt. Brit. 8. ARC RM 2475.

Cover date is 1952. S. O. Code no. 23-2475.

Engines and Propellers

24-FT. WIND-TUNNEL TESTS ON A "PADDLE-BLADE" PROPELLER, by A. B. Haines. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1946. 15p graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 107130

1. Propellers - Wind tunnel tests - Gt. Brit. 2. Propeller blades - Wind tunnel tests - Gt. Brit. 3. ARC RM 2493.

Cover date is 1952. S. O. Code no. 23-2493.

VALIDITY OF FULL-SCALE PROPELLER BRAKING TESTS IN THE R.A.E. 24-FT. WIND TUNNEL, by A. B. Haines and R. J. Monaghan. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1946. 9p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 107128

1. Propellers - Model tests - Gt. Brit. 2. Reynolds number - Effect - Gt. Brit. 3. Wind tunnels - Interference - Gt. Brit. 4. Brakes, Aircraft - Propeller - Gt. Brit. 5. ARC RM 2473.

Cover date is 1952. S. O. Code no. 23-2473.

WIND-TUNNEL TESTS ON THE SPOILING EFFECTS OF ENGINE COOLING GILLS ON RADIAL AIR-COOLED INSTALLATIONS ON A WING, by J. Seddon and J. A. Kirk. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jan 1942. 26p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.70. PB 107134

1. Wind tunnel tests - Gt. Brit. 2. Wings - Interference - Engine cooling gills - Gt. Brit. 3. Wings - Drag - Gt. Brit. 4. Engines, Aircraft - Air cooling - Gt. Brit. 5. Ducts, Air - Supersonic - Gt. Brit. 6. Interference, Nacelles - Gt. Brit. 7. ARC RM 2558.

Cover date is 1952. S. O. Code no. 23-2558.

Training and Training Devices

NIGHT VISION TRAINER AND TRAINING TECHNIQUES. I: PROJECTOR FOR BASIC NIGHT VISION TRAINING OF PILOTS, by H. W. Rose and Horst Fleck. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1950. 11p photos, drawing Available from Library of Congress, Photoduplication Section, Washington 25, D. C. PB 107151

A projector for wide-angle projection at five different low levels of illumination was developed. It permits projection of any one of a selection of six fixed slides and, simultaneously, a moving slide with an aircraft silhouette. The projected picture on the screen shows a landscape over which an aircraft is moving horizontally. AAF SAM Project no. 21-31-610, Report no. 1.

AERODYNAMIC DESIGN OF HIGH MACH NUMBER NOZZLES UTILIZING AXISYMMETRIC FLOW WITH APPLICATION TO A NOZZLE OF SQUARE TEST SECTION, by Ivan E. Beckwith, Herbert W. Ridyard and Nancy Cromer. U. S. National Advisory Committee for Aeronautics. Jun 1952. 30p graphs, diagrs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107107

A method is given for the design of three-dimensional nozzles utilizing axisymmetric flow to produce uniform flow in a test chamber of arbitrary cross section. The method is applied to obtain the coordinates of a Mach number 10 nozzle for which a square test section is specified. Radial flow is used in a portion of the flow field to reduce the computation time. The remainder of the flow field is computed by the method of characteristics, but a simplified method is used near the axis. Tables which facilitate computation of the radial flow and the flow near the axis are included. Transition streamlines determined from the analytic expressions of Kuno Foelsch are compared with the streamlines obtained from the characteristic net of the Mach number 10 nozzle. NACA TN 2711.

BOUNDARY-LAYER DEVELOPMENT AND SKIN FRICTION AT MACH NUMBER 3.05, by Paul F. Brinich and Nick S. Diaconis. U. S. National Advisory Committee for Aeronautics. Jul 1952. 49p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107158

Boundary-layer studies consisting of schlieren observations and momentum surveys were made on hollow cylinder models with their axes alined parallel to the stream. Results were obtained for three model diameters and for natural and artificially induced turbulent boundary-layer flows. Transition Reynolds numbers were found to decrease with decreases in leading-edge thickness and with reductions in tunnel pressure level. Turbulent temperature-recovery factors generally decreased with increasing Reynolds number and were a maximum for the smallest transition Reynolds numbers. The results of this investigation appeared to be consistent with the theoretical turbulent friction formulas of Wilson and with the extended Frankl-Voishel analysis of Rubesin, Maydew, and Varga. Velocity profiles in the outer portion of the boundary layer could be approximated reasonably with a 1/7 power profile and were found to be approximately similar in this region. Velocity profiles given by the Kármán universal turbulent boundary-layer profile parameters were found to be similar in the laminar sublayer and in the turbulent region. NACA TN 2742.

EFFECT OF POINTED TIPS ON WING LOADING CALCULATIONS, by V. M. Falkner. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1946. 4p graph, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 107128

The standard formulae for calculation of wing loading by vortex lattice theory, which involve a sequence starting with $\sqrt{(1 - n^2)}$, are not strictly valid for pointed wing tips. On the other hand, the use of a sequence starting with $1 - n^2$ leads to overcorrection. By considering the mean of these two solutions for a delta wing it is shown that the error introduced by the use of the standard sequence is small and is on the safe side as regards bending moments. Cover date is 1952. S. O. Code no. 23-2483. ARC RM 2483.

EFFECTS OF ASPECT RATIO ON AIR FLOW AT HIGH SUBSONIC MACH NUMBERS, by W. F. Lindsey and Milton D. Humphreys. U. S. National Advisory Committee for Aeronautics. Jul 1952. 10p photos, graphs, diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107155

Schlieren photographs were used in an investigation to determine the effects of changing the aspect ratio from infinity to 2 on the air flow past a wing at high subsonic Mach numbers. The results indicated that the decreased effects of compressibility on drag coefficients for the finite wing are produced by a reduction in the compression shock and flow separation. NACA TN 2720.

EXPERIMENTAL INVESTIGATION OF THE LOCAL AND AVERAGE SKIN FRICTION IN THE LAMINAR BOUNDARY LAYER ON A FLAT PLATE AT A MACH NUMBER OF 2.4, by Randall C. Maydew and Constantine C. Pappas. U. S. National Advisory Committee for Aeronautics. Jul 1952. 22p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107174

Average and local skin-friction coefficients for laminar flow have been determined experimentally on a flat plate at a Mach number of 2.4 for Reynolds number range of 0.72×10^6 to 2.8×10^6 and compared with the laminar-boundary-layer theory of Chapman and Rubesin. The average skin-friction data were considerably higher than values predicted by laminar-boundary-layer theory. Local skin-friction coefficients, evaluated by the two methods, agreed well with the theory when plotted against a momentum-thickness Reynolds number. NACA TN 2740.

Micellaneous

CATALOG OF OSRD REPORTS, DIVISION 7: FIRE CONTROL (UNCLASSIFIED REPORTS) COMPILED AND EDITED BY SYLVIA E. WEISS AND HERBERT S. WHITE UNDER CONTRACT NAONR 13-47. U. S. Library of Congress. Technical Information Division. Jul 1952. 48p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 104375s8

1. Fire control - Bibliography.
Supplement to PB 104375.

REQUIREMENTS FOR GENERAL PURPOSE SUNGLASSES FOR OVER-THE-COUNTER SALE. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Apr 1952. 4p diagr Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 106885

1. Glasses, Sun - Lenses - Specifications 2. NMRI Proj NM 003 041.51 3. NAV MRL 52-6.

Memorandum report 52-6. Visual Engineering Section. BuMed Project NM 003 041.51 - Goggle design and evaluation.

SIMPLIFICATION IN BRITISH INDUSTRY. REPORT OF AN INQUIRY IN BRITAIN BY THE GROUP, APPOINTED BY THE COUNCIL, WHICH MADE AN INVESTIGATION OF SIMPLIFICATION IN THE UNITED STATES OF AMERICA. Anglo-American Council on Productivity. Aug 1950. 14p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.30. PB 106451

1. Industry - Organization, Control, etc. - Gt. Brit.

SUCTION OF MOISTURE HELD IN SOIL AND OTHER POROUS MATERIALS, by D. Croney, J. D. Coleman and Pamela M. Bridge. Gt. Brit. Dept. of Scientific and Industrial Research. Road Research Laboratory, Harmondsworth, England. Jan 1952. 52p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 107119

1. Soil moisture - Road tests - Gt. Brit. 2. Materials - Absorptive properties - Gt. Brit. 3. Cements - Water permeability - Gt. Brit. 4. Chalk - Water permeability - Gt. Brit. 5. Moisture - Determination - Gt. Brit. 6. Roads - Surface treatment - Water permeability - Gt. Brit. 7. DSIR RR TP 24.

S. O. Code no. 47-110-24.

Patents

Chemicals and Allied Products

GERMAN PATENTS: CLASS 12A, GROUPS 1 AND 2. CHEMICAL PROCESSES AND APPARATUS. Reichspatentamt, Berlin. 1877-1942. 1134f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $7.00, Enlargement Print $115.00. PB 82402

This microfilm reel, prepared from the files of the German Patent Office by FIAT personnel in Germany, contains 353 patents in Class 12a, groups 1 and 2: Chemical processes and apparatus. Boiling and digesting for chemical purposes and boiling down or concentrating for chemical purposes are included. In German. FIAT Microfilm Reel BB 65, Frames 1-1134.

GERMAN PATENTS, CLASS 12A, GROUPS 5, 6, AND 7; CLASS 12B; CLASS 12C, GROUP 1: CHEMICAL PROCESSES AND APPARATUS, ETC. Reichspatentamt, Berlin. 1877-1943. 1073f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $7.00, Enlargement Print $109.00. PB 82399

This microfilm reel, prepared from the files of the German Patent Office by FIAT personnel in Germany, contains 342 patents in Class 12a, 12b, 12c, groups 1, 5, 6 and 7: Chemical processes and apparatus, calcining, and fusing, dissolving, leaching, crystallizing and solidifying fuels. Separation, rectification, distillation, condensation, refrigeration and extraction are included. In German. FIAT Microfilm Reel BB 68, Frames 3134-4206.

GERMAN PATENTS, CLASS 12D, GROUPS 4, 6, 7, 8, 9, 10, 11, and 12: FILTRATION PLANTS, FILTER PRESSES, AND FILTERS. Reichspatentamt, Berlin. 1878-1940. 944f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $7.00, Enlargement Print $96.00. PB 82418

This microfilm reel, prepared from the files of the German Patent Office by FIAT personnel in Germany, contains 291 patents in Class 12d, groups 4, 6, 7, 8, 9, 10, 11, and 12: Filtration plants, filter presses, and filters. Filling and emptying apparatus for filtration plants; closures for presses; leaching out and washing in connection with filter presses; feed apparatus for filter presses, presses and apparatus for making filter cakes; filtering apparatus with loose, granular, or fibrous materials; charcoal filters; and filtering apparatus with solid filter material are included. In German. FIAT Microfilm Reel CC 84, Frames 1-944.

GERMAN PATENTS, CLASS 12E, GROUP 1; CLASS 12I, GROUPS 6, 7, 8, and 9: ABSORPTION AND PURIFICATION OF GASES AND THEIR COMPOUNDS. Reichspatentamt, Berlin. 1877-1941. 1121f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $7.00, Enlargement Print $114.00. PB 82400

This microfilm reel, prepared from the files of the German Patent Office by FIAT personnel in Germany, contains 412 patents in Class 12e, group 1, and Class 12i, groups 6, 7, 8, and 9: Absorption and purification of gases and their compounds. Production of chlorine compounds and halogen salts, including chloride of lime, chlorates, hypochlorites, and bromine and iodine and their compounds are included. In German. FIAT Microfilm Reel BB 73, Frames 8764-9885.

GERMAN PATENTS, CLASS 12I, GROUP 21: SULFUR AND ITS COMPOUNDS. Reichspatentamt, Berlin. 1877-1941. 399f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $7.00, Enlargement Print $41.00. PB 82412

This microfilm reel, prepared from the files of the German Patent Office by FIAT personnel in Germany, contains 157 patents in Class 12i, group 21: Sulfur and its compounds. Sulfurous acid and sulfites, sulfites of alkalies and alkaline earths are included. In German. FIAT Microfilm Reel CC 94, Frames not numbered.

AUSZUEGE DEUTSCHER PATENT-ANMEL DUNGEN (ABSTRACTS OF GERMAN PATENT APPLICATIONS)

This is a suggested list of references on the subject. Additional information may be obtained by writing to the Office of Technical Services, Department of Commerce, Washington 25, D. C.

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		TITLE
V. 1	PB 81800	Internal combustion engines. Class 46. March 1947. 712p. Printed copy $5.00 (In German)
V. 1	PB 81800s	Internal combustion engines. Class 46. List by sub. classes. Mar. 1947. 129p. tables only Mi $.50 Ph $16.25 (In German)
V. 2	PB 85155	Electrical engineering. Vol. 1 Classes $21a^1$, $21a^2$, $21a^3$, $21a^4$, 21b. n.d. 964p. Printed copy $5.00 (In German)
V. 3	PB 85191	Electrical engineering Vol. 11 Class 21c. n.d. 954p. Printed copy $5.00 (Text in German)
V. 4	PB 85195	Electrical engineering. Vol. 111 Classes $21d^2$, $21d^3$, 21e, 21f. Dec 1947. 816p. Printed copy $5.00 (Text in German)
V. 5	PB 85194	Electrical engineering. Vol. IV. Classes 21g, 21h, Oct 1947. 992p. Printed copy $5.00 (Text in German)
V. 6	PB 101049	Chemistry. Vol. 1 Classes 120-s, 22, 23, 30h, i. n.d. 949p Mi $9.00 Ph $118.75 (Text in German)
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V. 8	PB 85196	Chemistry. Vol. 111 Classes 39, 75. Oct 1947, 638p. Printed copy $5.00 (Text in German)
V. 9	PB 85193	Thermal engineering. Classes 13, 14, 24, 17, 60, 27, 59, 82, 88. Oct 1947. 972p. Printed copy $5.00 (Text in German)
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V. 14	PB 88833	Lifting mechanisms. Classes 35, 81. Feb 1948. 427p. Printed copy $5.00 (Text in German)
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V. 18	PB 85026	Miscellaneous. Classes 4, 30 (without h, i) 33, 43, 44f, 54, 55, 57, 74, 77, 79, 83. n.d. 1064p. Printed copy $5.00 (Text in German)
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